

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action, two action alternatives, and the No-Action Alternative. The Proposed Action and two action alternatives are designed to implement changes to Special Use Airspace (SUA) in South Carolina and Georgia to support current training requirements of the 20th Fighter Wing (20 FW) and 169th Fighter Wing (169 FW). Refer to Figure 1-2 for an explanation of the five different types of airspace used for training. This section describes the Airspace Training Initiative (ATI) proposed changes to two of those types of airspace.

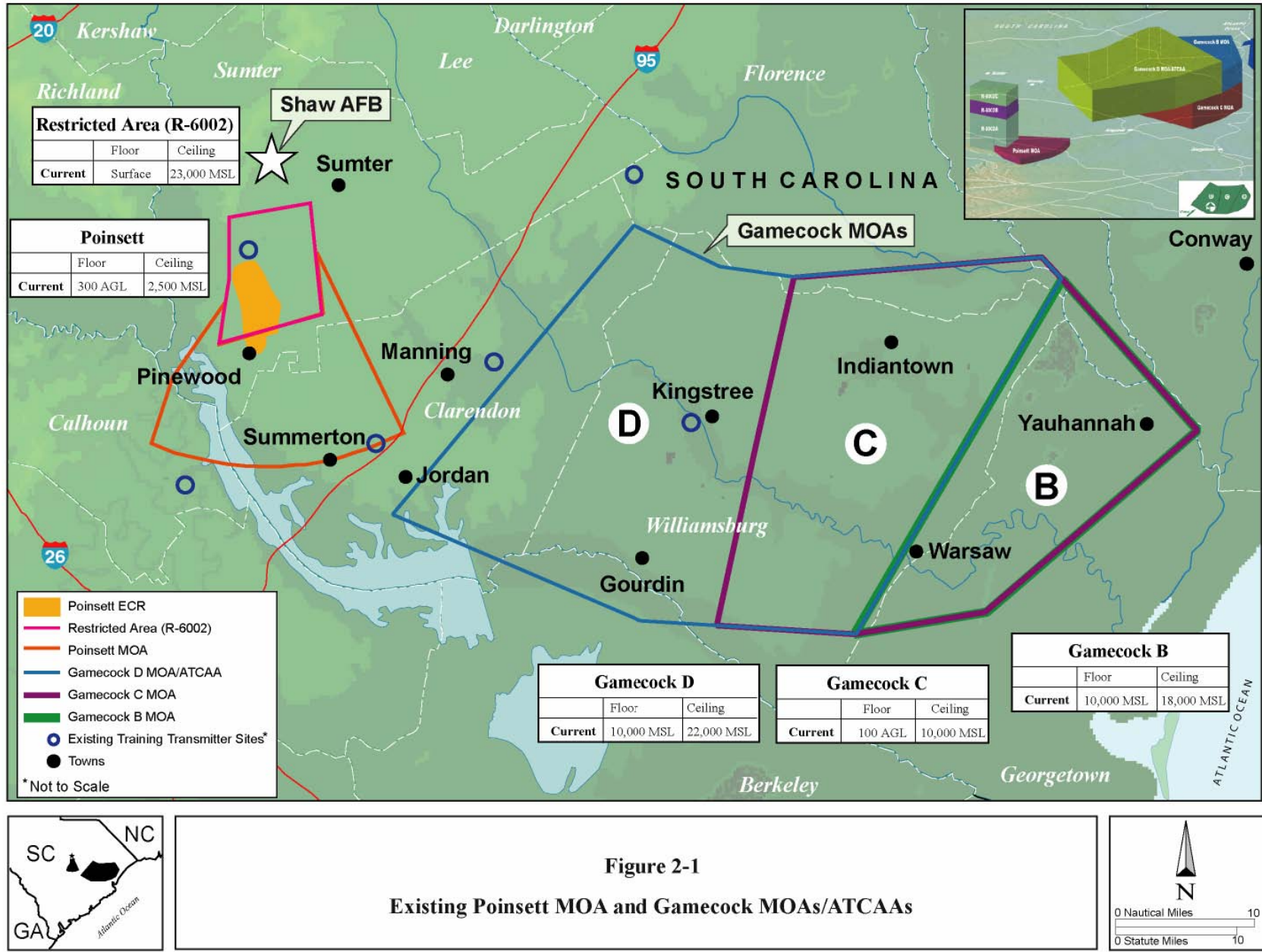
2.1 INTRODUCTION

The proposed Shaw Air Force Base (AFB) ATI would provide airspace configured and sized to accomplish realistic training in 20 FW and 169 FW missions. The existing airspace is depicted in Figure 2-1 for the Gamecock and Poinsett Military Operations Areas (MOAs) and associated Air Traffic Control Assigned Airspace (ATCAAs) in South Carolina. Figure 2-2 presents the existing Bulldog MOAs and associated ATCAA in Georgia.

Table 2-1 correlates the mission training requirements established by Air Force Instruction (AFI) 11-2F-16 Volume 1, *F-16 Aircrew Training*, with the existing airspace. The shortcomings of the current airspace for realistic training can be appreciated by considering the mission training requirements from Table 1-1 and reviewing the evaluation of the airspace's ability to support them in Table 2-1. As explained in Table 2-1, certain mission training can be accomplished in the existing airspace, but more advanced training to meet conditions faced in combat is limited by the current airspace configuration.

Implementing modifications to the Gamecock and Poinsett MOAs, the Bulldog MOAs, and the ATCAAs associated with these MOAs would configure and size the airspace to train 20 FW and 169 FW pilots to meet the conditions they currently face in combat.

The following section provides specific details of the Proposed Action (Section 2.2), two action alternatives (Sections 2.3 and 2.4), and the No-Action Alternative (Section 2.5). Section 2.6 provides a summary of the Proposed Action and alternatives. Section 2.7 provides information about developing and screening the alternatives. Alternatives considered but not carried forward are found in Section 2.8. Section 2.9 discusses the Environmental Impact Analysis Process (EIAP) as it applies to Shaw AFB's ATI. Section 2.10 provides comparisons of potential environmental consequences of the Proposed Action and alternatives, based on detailed analysis presented in Chapter 3.0.



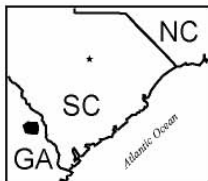
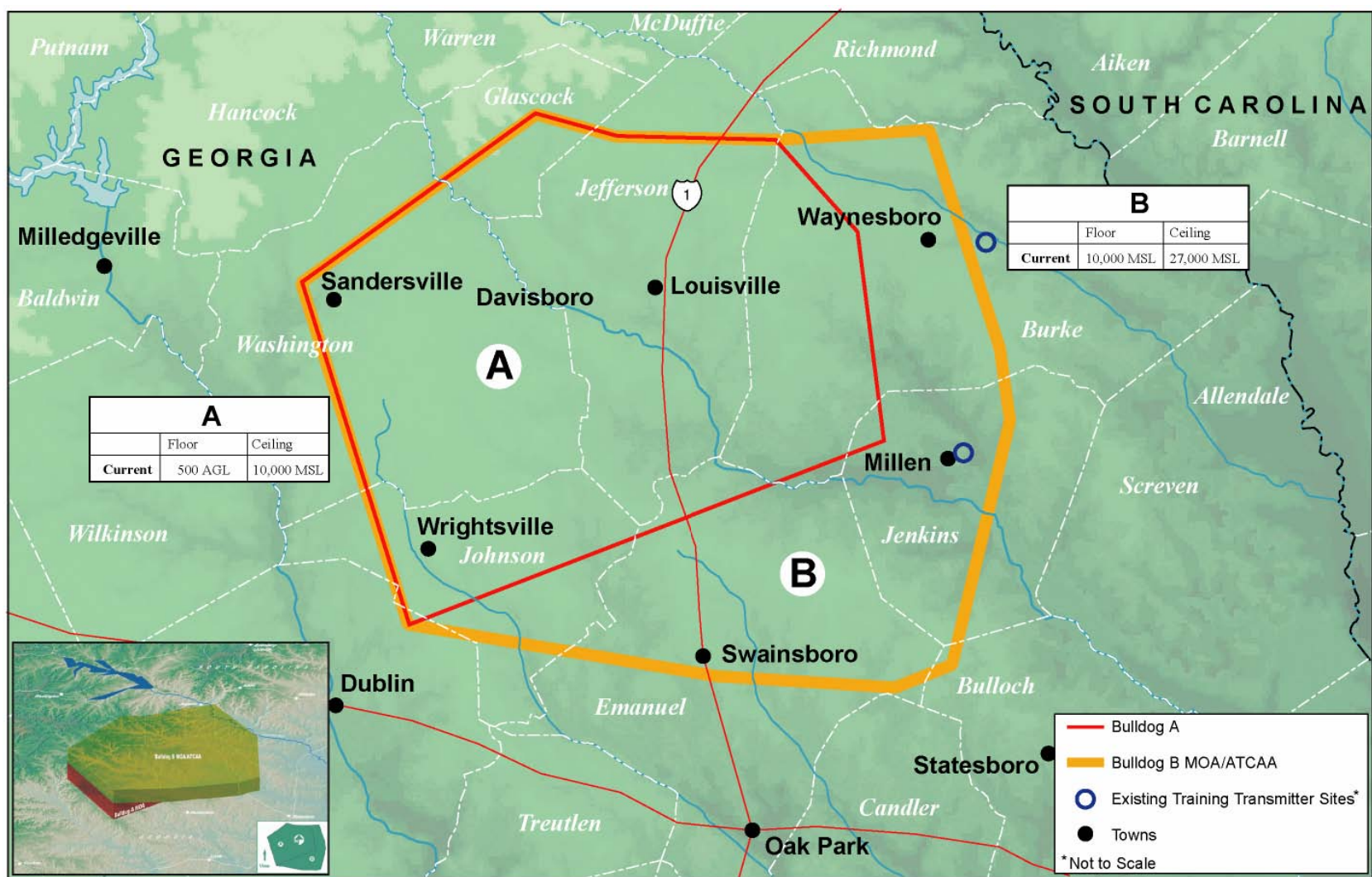


Figure 2-2
Existing Bulldog MOAs

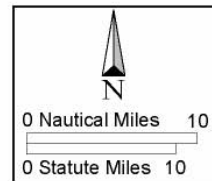


Table 2-1. Relationship of Airspace to Mission Training Requirements
(Page 1 of 3)

<i>Mission/Tactics</i>	<i>Discussion of Training Airspace</i>	<i>Airspace Constraints</i>	<i>ATI Improvements</i>
Basic Weapons Delivery and Tactical Weapons Delivery	Training occurs in a combination of the Poinsett MOA and the restricted airspace above the Poinsett Electronic Combat Range (ECR). In general, training in Basic Weapons Delivery is supported by the Restricted Area (R-6002) and the Poinsett MOA.	The relatively small size of these airspace elements and the lack of contiguous inter-connected airspace places constraints on the ability of the airspace to support the maneuvering required for tactical weapons delivery.	Expanding the Poinsett MOA provides for more realistic maneuvering space to improve Basic Weapons Delivery and Tactical Weapons Delivery training. The proposed Gamecock E connecting the Gamecock MOAs and the restricted airspace permits multiple missions and tactics training from the MOAs through to the range.
Surface Attack Tactics (SAT), Suppression of Enemy Air Defenses (SEAD), and Destruction of Enemy Air Defenses (DEAD)	Improved F-16 capabilities make target acquisition possible from a much greater distance than permitted by the Poinsett MOA and associated Restricted Airspace. Training requires developing skills in finding the target, maneuvering to allow attack on the target, accomplishing the attack, departure from the target area, and reforming into a tactical formation.	The lack of connecting airspace between the existing Gamecock MOAs and Restricted Airspace over the Poinsett ECR limits comprehensive training. Training in SEAD and DEAD is especially limited since a mission requires suppression from a distance (such as from the Gamecock MOA) followed by ensuring destruction through maneuvering from Gamecock all the way into the Poinsett ECR Restricted Airspace.	The proposed Gamecock E connecting Gamecock MOAs and the Poinsett ECR restricted airspace permits training for the full SEAD through DEAD missions. Extending Gamecock D provides maneuvering room to avoid simulated threats and acquire targets prior to fully pursuing the mission through to the Poinsett ECR. Expanding Bulldog A under Bulldog B creates airspace that permits SEAD and DEAD tactical training and exercises to acquire targets from multiple approach angles and altitudes.

Table 2-1. Relationship of Airspace to Mission Training Requirements
(Page 2 of 3)

<i>Mission/Tactics</i>	<i>Discussion of Training Airspace</i>	<i>Airspace Constraints</i>	<i>ATI Improvements</i>
Basic Fighter Maneuvering (BFM) and Air Combat Maneuvering (ACM)	Training occurs in a MOA/ATCAA complex, such as the Bulldog MOA, where fundamental and intra-flight coordination and two-ship maneuvering can be practiced.	The stratified or layered altitude structure of this airspace places artificial constraints on the flexibility required for effective training in these techniques. These constraints would not exist in an actual combat situation, and such constrained training teaches habits that can be extremely dangerous in combat. Pilots using military training airspace in the U.S. are often concerned about remaining within the horizontal and vertical boundaries of that airspace. Depending on the overall configuration of the airspace, they could be prevented from exercising the full range of tactical maneuvers of which the aircraft is capable. This creates artificial training constraints that would not exist in the combat environment, thereby limiting the overall realism of training.	The proposed extension of Bulldog A MOA would create a consistently bounded airspace supporting realistic BFM and ACM training.

Table 2-1. Relationship of Airspace to Mission Training Requirements
(Page 3 of 3)

<i>Mission/Tactics</i>	<i>Discussion of Training Airspace</i>	<i>Airspace Constraints</i>	<i>ATI Improvements</i>
Air Combat Tactics (ACT) and Tactical Intercepts (TI)	Improved F-16 target acquisition requires friendly and enemy aircraft to be separated by greater distances to begin training. In the Bulldog airspace, pilots need the ability to maneuver from lower to higher altitudes within a large contiguous airspace and to be separated from opposing air and ground threats for realistic training.	The stratified or layered altitude structure of this airspace places artificial constraints on the flexibility required for effective training in these techniques, which would not exist in an actual combat situation.	Extending Bulldog A to create a contiguous block of airspace permits pilots to practice tactical maneuvers at a range of altitudes, to respond to threats with appropriate maneuvers, to acquire targets at a realistic distance, and to pursue training missions to practice achieving effective control of the airspace.
Close Air Support (CAS), Advance Tactical Pods (ATP), and Combat Search and Rescue (CSAR)	Direct support to ground forces, including targeting and rescue training, requires a continuous airspace that reaches from a low altitude, to identify friendly ground forces or protect downed aircrews during rescue, to a high altitude for avoidance of surface threats and suppression of enemy air- and ground-based threats.	The non-contiguous nature and the stratified, or layered altitude structure of this airspace artificially constrains the flexibility required for effective training in these techniques. These constraints do not exist in an actual combat situation.	Expanding Gamecock D to become Gamecock F and extending Bulldog A to create realistic low to high airspace elevations permit more comprehensive and realistic search and rescue and CAS training. This training can be combined with higher altitude suppression of enemy defenses to create realistic battlefield conditions. Mission-specific ATP training for CAS and CSAR, and the integration of such training with SEAD and TI missions, permits pilots to become experienced in the multiple activities that occur in a real battle space.

2.2 PROPOSED ACTION

The Proposed Action is described in terms of four fundamental components:

- Modifications to airspace structure to provide varied altitudes and distances for aircraft activity within the airspace;
- Creation of new airspace to meet training requirements;
- Identification of new training transmitter sites to provide realistic threats; and
- Extension of defensive chaff and flare use in the new and modified airspace to practice avoidance of air and ground-based threats.

Details of these components are described in detail in the following sections. In addition, as part of the Proposed Action, a portion of the Shaw airspace would become available to be returned to the National Airspace System (NAS).

2.2.1 Modifications to Airspace Structure

The Proposed Action includes modifications of the airspace structure for Gamecock MOA, Poinsett MOA, and Bulldog MOA. The following discusses proposed changes in the respective airspace structures.

2.2.1.1 GAMECOCK MOA PROPOSED MODIFICATIONS

Gamecock MOAs are used by Shaw AFB for training. The three Gamecock MOAs that are part of ATI are Gamecock B, Gamecock C, and Gamecock D. Table 2-2 describes each MOA's vertical dimensions and provides information on the areas underlying the Gamecock MOAs.

Scoping Question: *Would the proposed Gamecock E MOA set a precedent for additional airspace?*

Answer: *The proposed Gamecock E MOA would not set a precedent for any other airspace. Gamecock E would fill an existing need to train to meet critical missions such as SEAD and DEAD that pursue enemy defenses from the MOA through to the delivery of training munitions on Poinsett Range.*

Table 2-2. Existing Gamecock MOA Location and Vertical Dimensions

<i>Training Airspace</i>	<i>South Carolina Underlying Counties</i>	<i>Current Floor¹</i>	<i>Current Ceiling²</i>
Gamecock B	Portions of Georgetown, Marion, and Horry	10,000 feet MSL	18,000 feet MSL
Gamecock C	Portions of Williamsburg, Florence, and Georgetown	100 feet AGL	10,000 feet MSL
Gamecock D	Portions of Williamsburg, Clarendon, and Berkeley	10,000 feet MSL ³	18,000 feet MSL

Notes: 1. Average ground elevation underlying MOAs is approximately 500 feet MSL.

2. By definition, MOAs extend from a charted altitude up to, but not including 18,000 feet MSL or less. Proposed ceilings reflect the inclusion of ATCAA from 18,000 feet MSL and above to further extend the vertical boundary of the airspace.

3. Operationally, the floor of Gamecock D MOA is restricted to 12,000 feet MSL per Letter of Agreement (LOA) between 20 FW and Jacksonville Air Route Traffic Control Center (ARTCC).

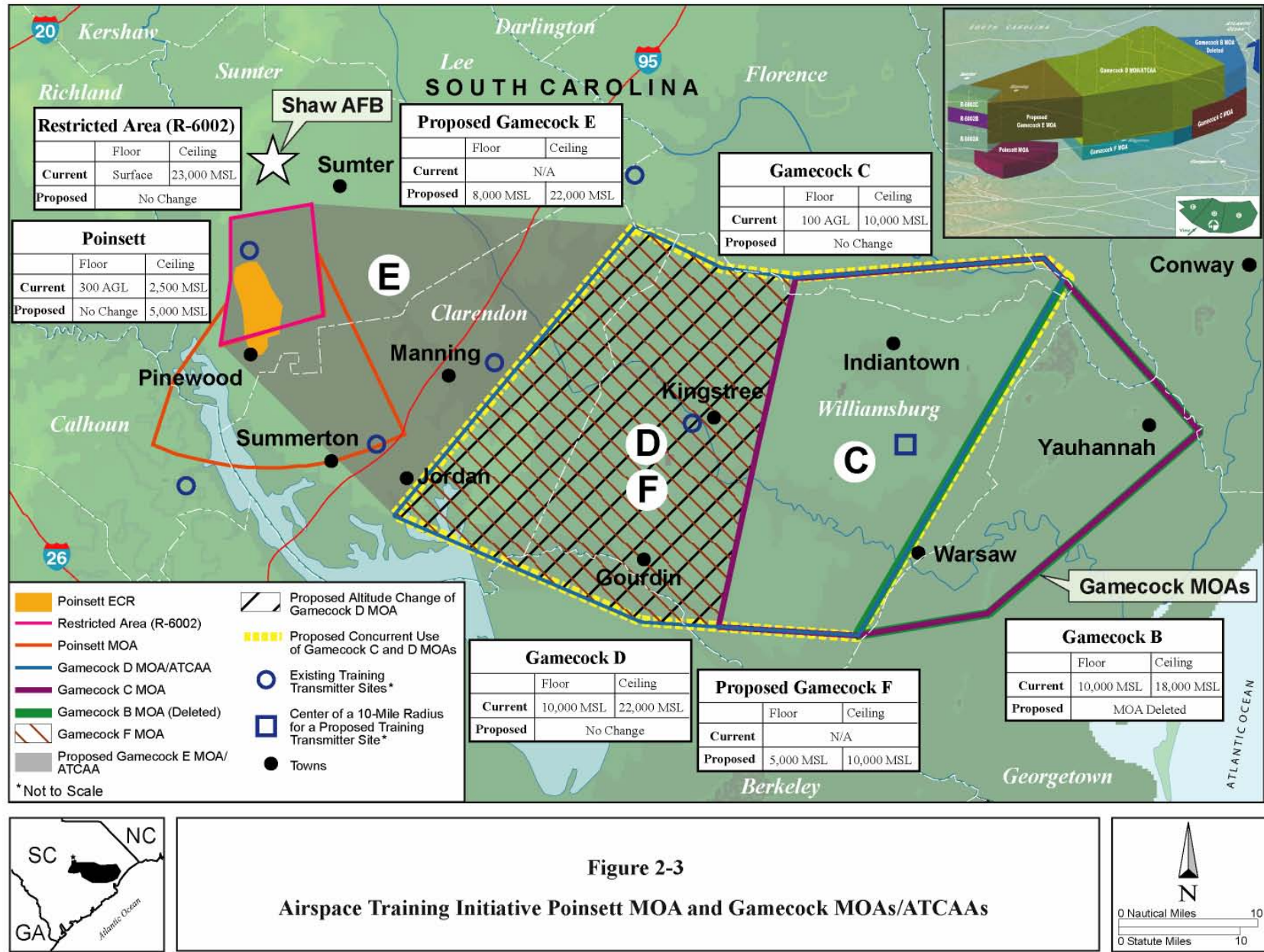
A new Gamecock E MOA would be created to form a “bridge,” allowing maneuvering and training between the Gamecock MOAs and the Poinsett ECR. This bridge is needed to connect the Gamecock MOAs with the Poinsett ECR. Figure 2-3 depicts the Proposed Action additions to the Gamecock MOAs. The proposed Gamecock E MOA would have a floor of 8,000 feet MSL and a ceiling of 22,000 feet MSL. As explained in the mission requirements in Table 2-1, the connecting Gamecock MOA would permit training in multiple surface attack missions, and especially in the critical SEAD and DEAD missions. This airspace would permit more realistic training in SAT, SEAD, and DEAD. Use of chaff and flares above 5,000 feet MSL would also be permitted to allow pilots to employ defensive training tactics. The floor of the western part of Gamecock D (where it does not overlap Gamecock C) would be lowered and the lowered portion would be designated Gamecock F. The proposed Gamecock F MOA would have a floor of 5,000 feet above mean sea level (MSL) and a ceiling of 10,000 feet MSL.

The airspace modifications and scheduling Gamecock C and D together would permit training in the modified Gamecock MOAs as a stand-alone MOA and would permit a realistic transition from Gamecock D into Poinsett ECR. This training requirement is necessary to support evolving tactics associated with the delivery of stand-off weapons.

Figure 2-4 depicts realistic mission training using the full capabilities of the F-16 within the modified Gamecock MOA. Typically, there would be two to six aircraft training in the airspace. The depiction in Figure 2-4 shows how these aircraft could execute missions over time. Multiple aircraft could (1) initially separate and perform counter-air against simulated enemy air threats. The training aircraft would then (2) stage for mission training and maneuver to avoid enemy ground threats simulated by the training transmitters. Chaff and flares would be used in the Gamecock MOAs for defensive training. The aircraft would (3) practice long-range SEAD and then proceed through enemy threats (4) to execute the DEAD mission on Poinsett ECR. Connecting the Gamecock MOAs to Poinsett would permit complete execution of the DEAD mission with the delivery of training ordnance on Poinsett ECR targets. The training aircraft would (5) reform after mission execution and either perform additional mission training or return to Shaw AFB.

Under the Proposed Action, the new Gamecock E would be created, Gamecock D structure would be modified and designated Gamecock F, and Gamecock B would be deleted and returned permanently to the NAS. The proposed changes in the Gamecock MOAs and modification to Poinsett (see Section 2.2.2.2) would provide sufficient airspace volume to meet realistic training requirements within the Gamecock MOAs without the use of Gamecock B. The addition of Gamecock E and F and the release of Gamecock B demonstrates that the Proposed Action meets training needs and is not an airspace expansion precedent.

No changes in airspace structure of Gamecock C are included in the Proposed Action.



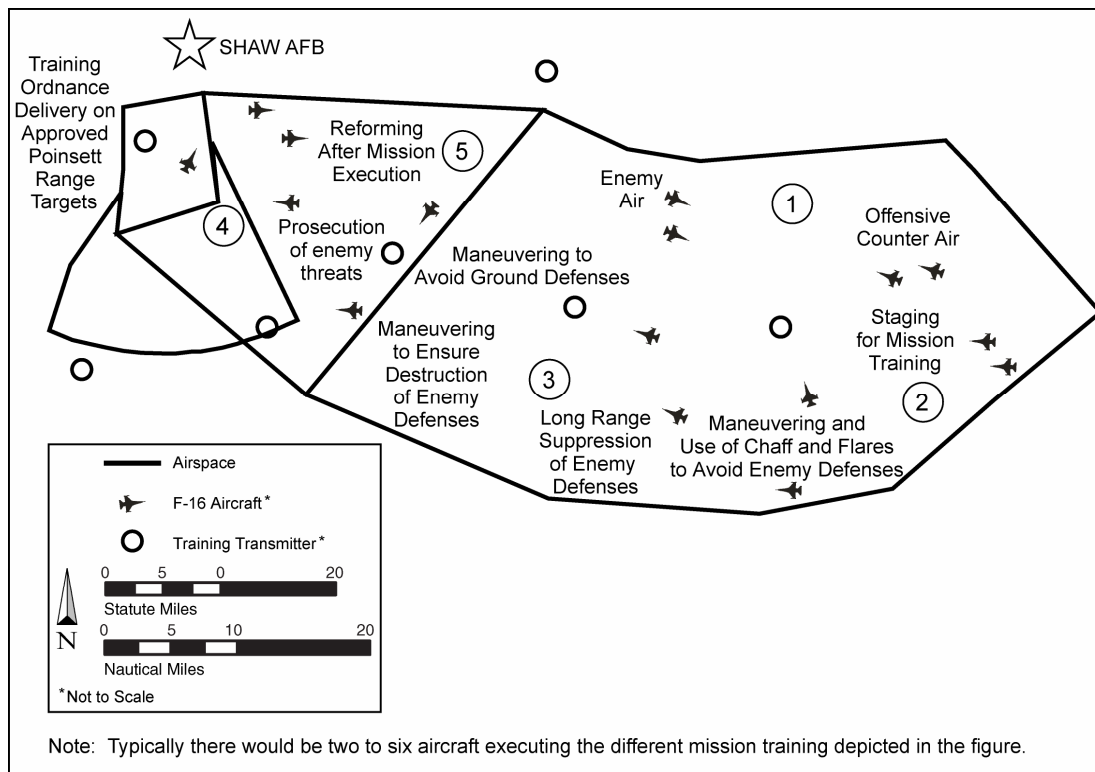


Figure 2-4. Representative Realistic Mission Training in the Proposed Gamecock MOAs

2.2.1.2 POINSETT MOA PROPOSED MODIFICATIONS

Poinsett MOA overlies portions of Sumter, Calhoun, and Clarendon Counties in South Carolina. The floor of Poinsett is currently charted at 300 feet above ground level (AGL), with a ceiling of 2,500 feet MSL. Under the Proposed Action, the floor would remain the same and the vertical extent of Poinsett would be expanded by raising the ceiling to 5,000 feet MSL. This change, noted in Figure 2-3, would increase the airspace volume available and provide for realistic aircrew maneuvering for surface attack and related missions. Under the Proposed Action, the Poinsett MOA would not be concurrently used with Gamecock E to meet commercial and general aviation needs.

2.2.1.3 BULLDOG MOA PROPOSED MODIFICATIONS

Bulldog MOA is comprised of two existing components designated Bulldog A and Bulldog B. Table 2-3 provides information on the areas underlying these components, as well as on their existing vertical dimensions.

Table 2-3. Bulldog MOA Location and Vertical Dimensions

<i>Training Airspace</i>	<i>Georgia Underlying Counties</i>	<i>Current Floor</i> ¹	<i>Current Ceiling</i> ²
Bulldog A	Portions of Washington, Jefferson, Johnson, Glascock, Burke, Jenkins, and Emanuel	500 feet AGL	10,000 feet MSL
Bulldog B	Portions of Burke, Emanuel, Jefferson, Washington, Glascock, Jenkins, and Johnson	10,000 feet MSL ³	27,000 feet MSL

- Notes: 1. Average ground elevation underlying MOAs is approximately 500 feet MSL.
2. By definition, MOAs extend from a charted altitude (floor) up to, but not including 18,000 feet MSL or less. Proposed ceilings reflect the inclusion of ATCAA to further extend the vertical boundary of the airspace.
3. Operationally, the floor of Bulldog B MOA east and south of Bulldog A MOA is restricted to 11,000 feet MSL per LOA between 20 FW and Atlanta ARTCC.

Under the Proposed Action, the airspace structure of Bulldog A MOA would be expanded to the east under the Bulldog B “shelf” to match the boundary of the existing Bulldog B. This modification, shown in Figure 2-5, would increase the airspace volume available for aircrew training in the Bulldog MOAs and would provide for more efficient and effective use of the existing airspace. By eliminating the shelf, military pilots would have adequate airspace to identify and avoid or suppress air or ground-based threats.

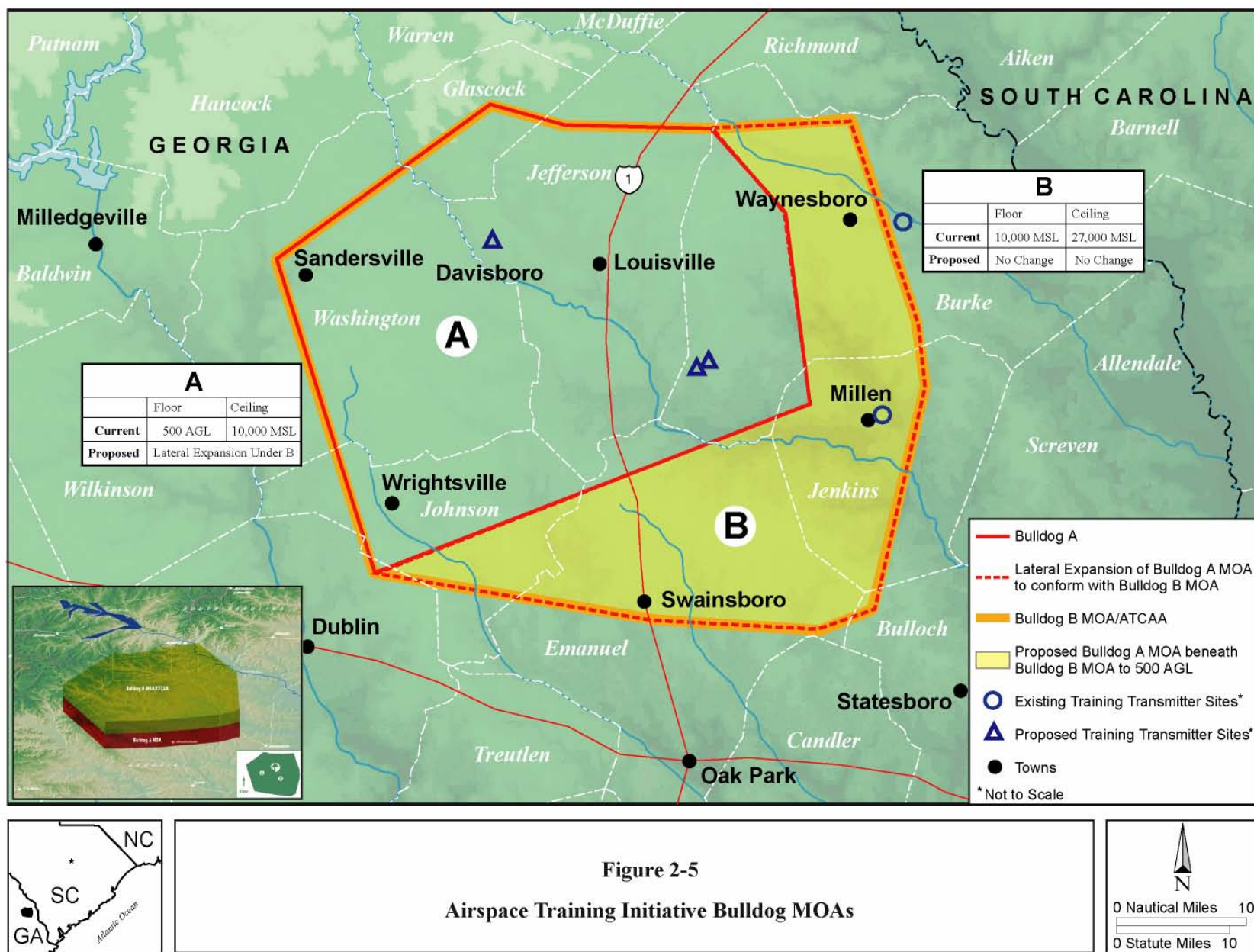
Figure 2-6 depicts realistic full capability mission training for F-16 pilots within the modified Bulldog MOAs. The multiple aircraft could (1) initially stage for mission training then (2) separate to perform enemy air or offensive counter air maneuvers at varied altitudes. Next, the training aircraft would (3) maneuver to maintain air superiority and train in the SEAD and DEAD missions. The full expanse of airspace would permit the training aircraft to acquire enemy defenses and attack those defenses from greater distances. Chaff and flares would be used in the Bulldog MOAs for defensive training. Delivery of training ordnance would only occur at the Poinsett ECR. Pilots could (4) practice search and rescue and/or close air support missions at slower speeds and lower altitudes required for such missions. The training aircraft would (5) reform after mission execution and either perform additional mission training or return to Shaw AFB.

2.2.1.4 SUMMARY OF AIRSPACE CHANGES

Table 2-4 summarizes the changes in airspace structure that would be implemented under the Proposed Action. The Proposed Action distributes training flights within the airspace to better accommodate training requirements.



During a single training mission, pilots may fly their aircraft through several individual elements of military training airspace.



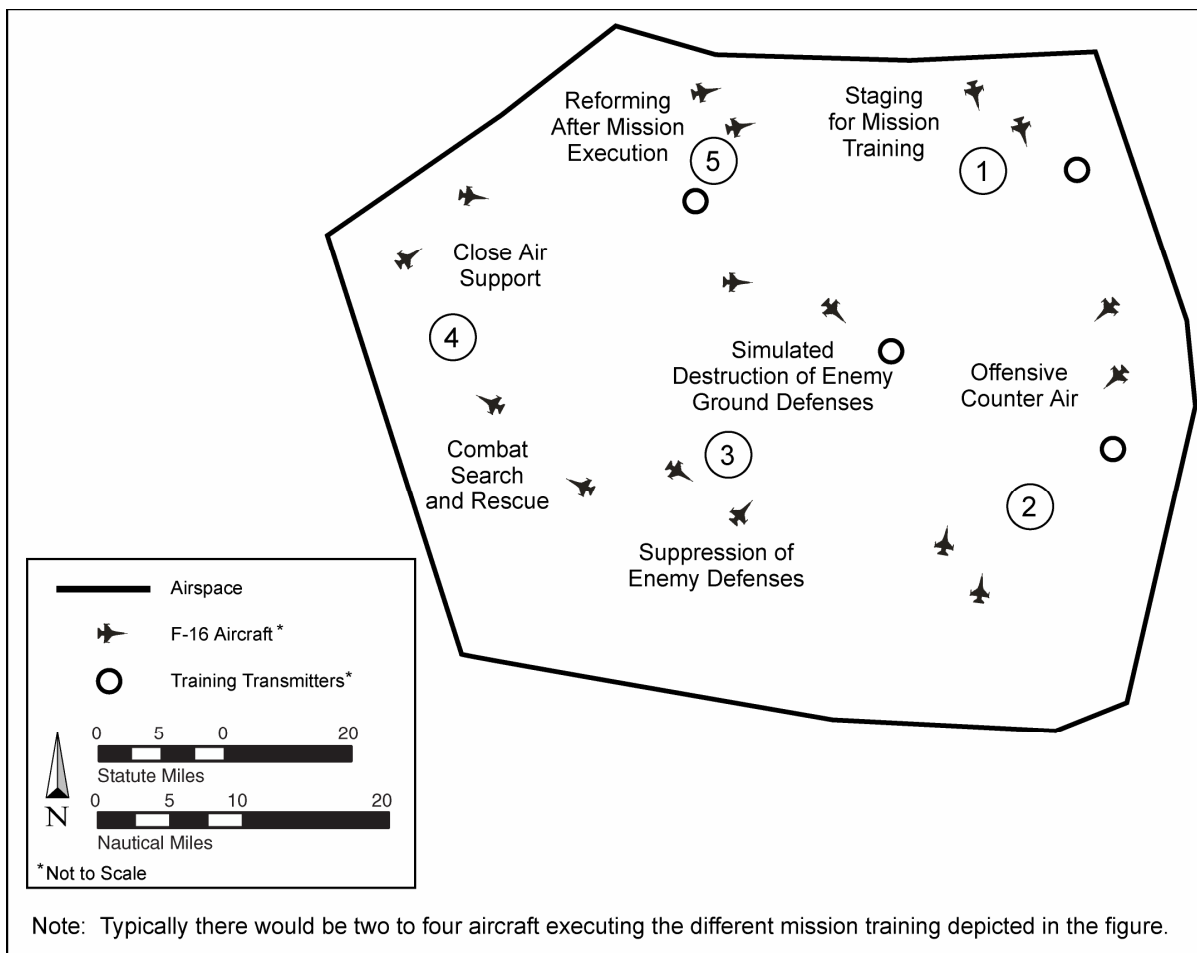


Figure 2-6. Representative Training Mission within the Bulldog MOAs

Table 2-4. Summary of Changes in Airspace under the Proposed Action

<i>Training Airspace</i>	<i>Underlying Counties</i>	<i>Current Floor¹</i>	<i>Current Ceiling²</i>	<i>Proposed Floor</i>	<i>Proposed Ceiling³</i>	<i>Change</i>
Gamecock B	Georgetown, Marion, and Horry, South Carolina	10,000 feet MSL	18,000 feet MSL	MOA Deleted	MOA Deleted	MOA Deleted
Gamecock C	Williamsburg, Florence, and Georgetown, South Carolina	100 feet AGL	10,000 feet MSL	100 feet AGL	10,000 feet MSL	No Change
Gamecock D	Williamsburg, Clarendon, and Berkeley, South Carolina	10,000 feet MSL ³	18,000 feet MSL	10,000 feet MSL	18,000 feet MSL	No Change
Gamecock E (new)	Sumter and Clarendon, South Carolina	N/A	N/A	8,000 feet MSL	22,000 feet MSL	New MOA Airspace connecting Gamecock with Poinsett R-6002
Gamecock F (new)	Williamsburg, Clarendon, and Berkeley, South Carolina	N/A	N/A	5,000 feet MSL	10,000 feet MSL	New MOA Airspace under Gamecock D
Poinsett	Sumter, Calhoun, and Clarendon, South Carolina	300 feet AGL	2,500 feet MSL	300 feet AGL	5,000 feet MSL	Vertical Expansion
Bulldog A	Washington, Jefferson, Johnson, Glascock, Burke, Jenkins, and Emanuel, Georgia	500 feet AGL	10,000 feet MSL	500 feet AGL	10,000 feet MSL	Lateral Expansion to conform with Bulldog B
Bulldog B	Burke, Emanuel, Jefferson, Washington, Glascock, Jenkins, and Johnson, Georgia	10,000 feet MSL ⁴	27,000 feet MSL	No Change	No Change	No Change

Notes: 1. Average ground elevation underlying MOAs is approximately 500 feet MSL.

2. By definition, MOAs extend from a charted altitude up to, but not including 18,000 feet MSL or less.

Proposed ceilings reflect the inclusion of ATCAA to further extend the vertical boundary of the airspace.

3. Operationally, floor of Gamecock D MOA is restricted to 12,000 feet MSL per LOA between 20 FW and Jacksonville ARTCC.

4. Operationally, floor of Bulldog B MOA east and south of Bulldog A MOA is restricted to 11,000 feet MSL per LOA between 20 FW and Atlanta ARTCC.

2.2.1.5 TRAINING WITHIN THE AIRSPACE

This section describes the current and proposed training activity within the proposed ATI airspace. Training activity within the airspace is described in terms of sorties and sortie operations. A *sortie* is defined as a single aircraft taking off, performing one or more training missions, and returning to base. During the training, the aircraft may be flown in several airspace elements. When one aircraft uses one airspace element, that aircraft is said to be conducting one sortie operation. On one training sortie, an aircraft may fly through a number of airspace elements. This would produce a corresponding number of sortie operations. For example, if an F-16 flew from Shaw AFB through Gamecock B and C MOAs, this would count as one sortie and two sortie operations. The number of sortie operations identified for individual airspace elements will normally be greater than the number of sorties flown from Shaw AFB.

The term aircraft hours is used to describe the amount of time an airspace is used by training aircraft. Aircraft hours quantify the use of the airspace when an airspace element is scheduled. During a scheduled, or reserved time, an airspace element may be used by numerous training aircraft. Technical analysis of environmental resources, such as noise, safety, and air quality, requires details beyond the airspace scheduled time. The term aircraft hours reflects the number of aircraft and the flight time each aircraft spends in an airspace element. For example, if an airspace element were scheduled for an hour and during that hour six aircraft fly in the airspace element for 20 minutes each, this would equate to a total of two aircraft hours (6 x 20 minutes) in the airspace element.

Table 2-5 presents the current distribution of individual aircraft by type within the airspace affected by the Proposed Action. The table provides the annual hours for which the airspace is scheduled and the number of specific aircraft sortie operations conducted in that airspace. The aircraft shown account for all users of the airspace, not just aircraft assigned to the 20 FW and 169 FW.

Table 2-6 compares current and proposed altitude distributions and flight activity. The altitude distributions are based on estimates of the percent of time an individual aircraft spends in each altitude range for each airspace element. The calculated aircraft hours are based on the percentage of time in the altitude range and the total aircraft hours estimated for each airspace element.

The ATI Proposed Action permits a general shift of training activity from lower and higher altitudes to the mid-level altitudes. The net increase in sortie operations is due to the deletion of the Gamecock B MOA (216 sortie operations) and adding the Gamecock E MOA (5,349 sortie operations). In terms of aircraft training hours, the Gamecock, the Bulldog, and Poinsett MOA use is projected to remain relatively unchanged.

The restructuring of the Gamecock MOA complex increases overall training effectiveness and efficiency. The changes in airspace volume mean that the estimated time spent by each training aircraft in each specific airspace element is estimated to change from the current 30 minutes to 20 minutes. The total aircraft hours spent training within the airspace depend on specific missions, fuel allotments, and deployments. Overall, the total number of aircraft training hours would not be expected to substantively change with the proposed ATI.

Table 2-5. Aircraft Type Distribution Annually by Airspace Unit Under Existing Conditions ¹

<i>Aircraft</i>	BULLDOG		GAMECOCK B ²		GAMECOCK C		GAMECOCK D		POINSETT MOA		R-6002	
	<i>Sched. Hours</i>	<i>Sortie Operations</i>	<i>Sched. Hours</i>	<i>Sortie Operations</i>	<i>Sched Hours</i>	<i>Sortie Operations</i>	<i>Sched Hours</i>	<i>Sortie Operations</i>	<i>Sched. Hours</i>	<i>Sortie Operations</i>	<i>Sched. Hours</i>	<i>Sortie Operations</i>
F-16	1,265	4,427	36	216	892	2,594	1,384	4,143	33	140	1,238	2,590
F-15	20	80	0	0	128	512	102	408	3	14	122	255
F-18	706	1,353	0	0	240	720	140	576	4	19	172	360
F-14	0	0	0	0	0	0	0	0	0	0	0	0
AV-8B	20	60	0	0	30	90	12	36	1	1	11	23
A-10	0	0	0	0	474	1,422	50	150	2	5	45	94
EA-6B	0	0	0	0	0	0	12	36	1	1	11	23
Total	2,011	5,920	36	216	1,764	5,338	1,700	5,349	44	180	1,599	3,345

Notes: 1. Fiscal Year (FY) 2003 Data

2. Operational Readiness Exercises (OREs) and Operational Readiness Inspections (ORIs) only.

Table 2-6. Existing and Projected Annual Use of Proposed Action Airspace

	AIRSPACE OPERATIONS (PERCENT TIME AT INDICATED ALTITUDES) UNDER CURRENT (CUR.) AND PROPOSED (PROP.) CONDITIONS													
Altitude	500-1,000		1,000-2,000		2,000-5,000		5,000-10,000		10,000-FL170		FL170-FL230		> FL230	
Airspace	Cur.	Prop.	Cur.	Prop.	Cur.	Prop.	Cur.	Prop.	Cur.	Prop.	Cur.	Prop.	Cur.	Prop.
Bulldog	5	5	5	5	5	5	10	10	60	60	10	10	5	5
Gamecock B	0	0	0	0	0	0	5	0	95	0	0	0	0	0
Gamecock C	10	10	10	10	40	40	40	40	0	0	0	0	0	0
Gamecock D/F ¹	0	0	0	0	0	10	0	50	85	25	15	15	0	0
Gamecock E	0	0	0	0	0	0	0	40	0	45	0	15	0	0
Poinsett	50	25	50	25	0	50	0	0	0	0	0	0	0	0
R-6002	8	8	8	8	8	8	24	24	32	32	20	20	0	0
AIRCRAFT HOURS														
Bulldog	148	148	148	148	148	148	296	296	1,776	1,776	296	296	148	148
Gamecock B	0	0	0	0	0	0	5	0	103	0	0	0	0	0
Gamecock C	267	178	267	178	1,068	711	1,068	711	0	0	0	0	0	0
Gamecock D/F ¹	0	0	0	0	0	178	0	891	2,273	445	401	267	0	0
Gamecock E	0	0	0	0	0	0	0	712	0	802	0	267	0	0
Poinsett	8	4	8	4	0	7	0	0	0	0	0	0	0	0
R-6002	134	134	134	134	134	134	401	401	535	535	335	335	0	0

Note: 1. Under current conditions, data pertain to Gamecock D only; under proposed conditions, Gamecock D/F are considered collectively.

Source: Personal communication, Byers 2004.

Neither the configuration nor use of MTRs, the Poinsett ECR, or the offshore Warning Areas would change under the Proposed Action or an alternative.

2.2.2 Placement of New Training Transmitter Sites

Currently, six training transmitter sites are adjacent to or beneath the Gamecock and Poinsett MOAs and three training transmitter sites are adjacent or beneath the Bulldog MOAs (see Figure 1-3). Under the Proposed Action, additional electronic training transmitter sites would be established or identified at various locations under the Gamecock C MOA, the Bulldog A MOA, and at several locations along the South Carolina coast. Training transmitter sites along the South Carolina coast would allow limited SEAD/DEAD training in offshore Warning Areas described in Figure 1-2 and located on Figure 1-3. The ability to use the higher altitudes available in W-161 and W-177 would enhance the training effectiveness of these electronic warfare assets in this offshore airspace. As depicted in Figure 1-3, the Proposed Action includes one additional training transmitter site beneath Gamecock C MOA; two additional training transmitter sites near Grange and Magruder (two sites near Magruder and the Grange site were analyzed as part of the proposed action), beneath Bulldog A MOA; and three training transmitter sites in a 10-mile radius of the South Carolina coastal cities of Georgetown, McClellanville, and Awendaw.

DESCRIPTION OF TRAINING TRANSMITTERS

The training transmitter sites under or near the MOAs create realistic threats within the MOA airspace, and the training transmitter sites along the coast project threats into the offshore Warning Areas and into MOAs. The offshore Warning Areas are important elements of Shaw training airspace (see Figure 1-2).

A representative type of threat emitter is the Mini-Multiple Threat Emitter System (Mini-MUTES). Mini-MUTES are sited at the existing training transmitter sites and provide pilots with simulated threats to train in threat avoidance. The Mini-MUTES shown here project the electronic radiation of multiple, realistic threat signals. These signals simulate an integrated air defense system as may be encountered in combat. By reacting to this simulated threat, aircrews can train and be monitored under controlled and measurable conditions. Each Mini-MUTES consists of a tracking antenna, emitter/ receiver antennas, and transmitter enclosures. Mini-MUTES units are located on a rotating base, mounted on a 32-foot long, 8-foot wide flatbed trailer.



The signals from this threat emitter system simulate an integrated air defense system typical of defenses encountered in combat.

LOCATION OF TRAINING TRANSMITTERS

For the safe use, control, and maintenance of the transmitter system, ideal placement is determined by four elements:

- System should be located on a slight rise having an unobstructed view of the airspace;
- The electrically powered system requires good vehicular access and nearby electric and phone service;
- System operation requires a safety buffer of approximately 400 feet, depending on the size and power of the transmitter; and
- Open, agricultural areas are more desirable than urban areas or areas with large population concentrations.

Training transmitter sites for Gamecock C MOA and along the South Carolina coast would be located according to the requirements of placement.

Under the Bulldog A MOA, three potential sites have been identified for the installation of two additional training transmitter locations (refer to Figures 1-3 and 2-4). One site is located in Jefferson County, Georgia, on agricultural land located approximately one-half mile south of State Route (SR) 171. Known as the Grange site, it is connected to SR 171 by a well-maintained graded dirt road and has nearby electric and phone service. Located on a slight rise at an elevation of 367 feet above sea level, it has an extensive view of the surrounding airspace. A preliminary evaluation of potential environmental concerns (Environmental Data Resources, Inc. [EDR] 2005a) as well as a field evaluation (SAIC 2005) did not identify any issues that would preclude the selection of this site.

The second and third sites, known as Magruder north and south, are located in Burke County and are near Magruder, Georgia. Both sites have nearby access to electric and phone service and are adjacent to maintained roads. Magruder north is located next to Magruder-Rosier Road, 0.47 mile from the town of Magruder and sits at an elevation of 292 feet above sea level. The area is currently pasture land. Although the preliminary environmental evaluation (EDR 2005b) did not identify any concerns with the area of Magruder north, a field evaluation located an archaeological site having both prehistoric and historic components (SAIC 2005). Based on selection criteria, the presence of sensitive environmental resources could make Magruder north the less desirable of the two possible Magruder locations. Magruder south is located off Cobb Road, approximately 1.4 miles from the town of Magruder. The area sits at an elevation of 309 feet above sea level and is currently in cultivation. A preliminary evaluation of potential environmental concerns (EDR 2005c) in addition to a field evaluation (SAIC 2005) did not identify any issues that would preclude the selection of this site.

The transmitter sites along the South Carolina coast would be within a 10-mile radius of the cities of Georgetown, McClellanville, and Awendaw (refer to Figures 1-3 and 2-3 for existing sites and proposed locations). Coastal sites have not been identified. They will follow the same site investigation described above under the Bulldog MOA, as well as all applicable environmental impact analysis and permitting.

DETAILS OF THE TRAINING TRANSMITTER SITES

Figure 2-7 provides a representative diagram of a typical training transmitter site layout. The approximate design, including area is depicted.

Each Mini-MUTES would be placed on a gravel pad measuring 150 feet by 150 feet, yielding an area of approximately 0.5 acres. The pad area would be enclosed by a 6-foot-high chain link fence topped with three strands of barbed wire. The Mini-MUTES is designed to be self-contained and unmanned. Periodic routine maintenance and servicing would occur.

An outer perimeter measuring 800 feet by 800 feet would be enclosed by a three-strand smooth wire fence, creating an approximate 15 acre safety buffer zone. The size of the buffer zone could vary depending on the size and power of the transmitter. While the perimeter fence would serve to limit general access, coordination between the landowner and the Air Force would permit current land use between the perimeter and the pad enclosure. Only the 0.5-acre pad enclosure would be removed from use. Both fences would have lockable gates. Replicas of threat equipment may be placed within the 15 acres to provide visual cues to pilots. Figure 2-8 presents examples of real threats and replica threats.

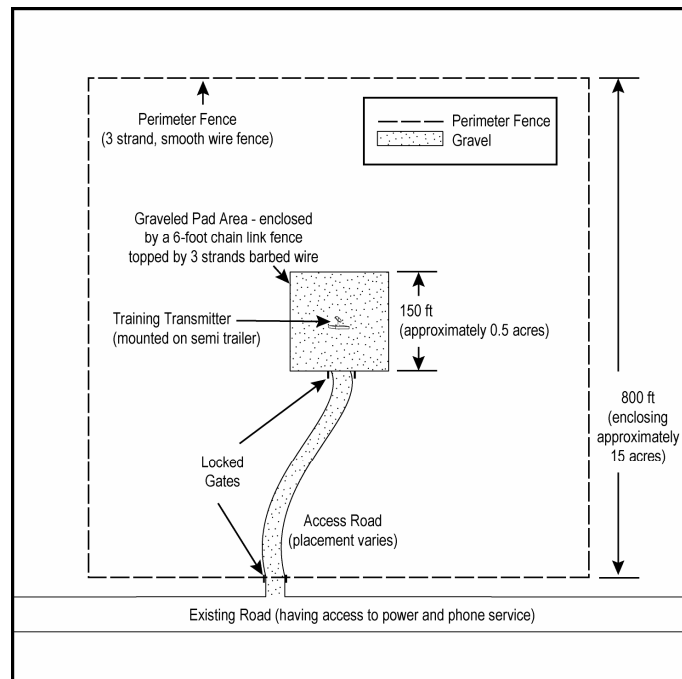


Figure 2-7. Training Transmitter Site Representative Diagram

Each training transmitter site would be serviced by local electrical power and telephone service. An improved gravel access road would be constructed to the transmitter site from the hard surface road, the exact placement of which would depend on the surrounding infrastructure. The area disturbed for the transmitter footprint and temporary construction staging area, including the gravel access road, would be approximately 0.6 acres.

2.2.3 Use of Chaff and Flares

Chaff and flares are defensive counter measures used to defend against air or ground-based threats. Chaff, bundles of extremely small strands of aluminum-coated silica fibers, is designed to briefly confuse opposition radar and permit a pilot to maneuver to avoid the threat. Flares are used to attract enemy heat-seeking missiles and lead them away from the targeted aircraft. Flares used in defensive training burn out in approximately 400 feet and would not be deployed below 5,000 feet MSL or approximately 4,500 feet AGL. This means that flares would burn out approximately 4,100 feet AGL.

Real Threats. During conflicts, enemy forces attempt to protect assets by positioning defensive weapons to prevent U.S. forces from completing their missions. Examples of real threats Shaw AFB pilots will face are pictured at right. A realistic training environment simulates opposing radar, air-to-air missiles, and surface-to-air missiles.



Training Transmitters. Opposing radar is simulated by training transmitters or emitters, such as the one at left. These on-the-ground transmitters are under or near training airspace and simulate real threats "fired" at the aircrews. Pilots must learn to quickly react to these threats.

Replica Threats at Training Transmitter Sites. The proposed training transmitter sites would be located on open areas of approximately 15 acres. Mock threats (pictured right) that look like a radar (top) or missiles (bottom) may be situated within the approximately 15 acres to give pilots visual training realism. Transmitter sites would require an access road, electrical power and telephone connection.



Figure 2-8. Real and Replica Threats

Effective air combat training requires that pilots instantaneously react to a threat by deploying chaff or flares as defensive counter measures. Figure 2-9 depicts the life cycle of defensive chaff and flares. Under the Proposed Action, the use of training chaff and flares in the existing Gamecock and Bulldog MOAs presented in Table 2-7 would be extended into the new and modified airspace established under the Proposed Action. There would not be an increase in the use of chaff and flares within the overall airspace, although there would be a redistribution of chaff and flares within the new and modified airspace.

Winds at the altitude chaff and flares are deployed and at altitudes between deployment and the ground would affect the drifting and ultimate deposition of residual materials. The eventual location of chaff fibers would depend on the release altitude and winds at different altitudes. Training aircraft have been found to fly randomly within an airspace (United States Air Force [Air Force] 1997a). For the purpose of this Environmental Impact Statement (EIS), all chaff fibers are assumed to fall to the ground under the airspace and are assumed to be evenly distributed throughout the airspace. In actual practice, pilots tend to avoid flying near the boundaries of the airspace to avoid flying outside the SUA. This would reduce the use of flares and chaff within 1 to 2 miles of the airspace edge.

CHAFF

Modern training chaff (such as RR-188) consists of bundles of extremely small strands of aluminum-coated silica fibers that are designed to reflect radio waves from a radar set. Chaff is made as small and light as possible so that it will remain in the air long enough to confuse enemy radar. Individual chaff fibers (known as “angel hair” chaff) are approximately the thickness of a very fine human hair and range in length from 0.3 inch to 1.0 inch (0.76 centimeters to 2.5 centimeters). The length of the chaff determines the frequency range of the radio wave most effectively reflected by that particular fiber. Chaff fibers are cut to varying lengths to make them effective against the wide range of enemy radar systems that may be encountered. Chaff used in the Shaw airspace is training chaff. This specific chaff contains fibers cut to lengths that will not interfere with radars operated by the Federal Aviation Administration (FAA) for Air Traffic Control (ATC) throughout the NAS. Combat chaff, which is not proposed for use in the airspace, does contain fibers cut to lengths that can interfere with ATC radars.

About 5 million chaff strands are dispensed in each bundle of chaff. When released from an aircraft, chaff initially forms an “electronic cloud” that disperses widely in the air. Dispersed chaff effectively reflects radar signals and forms an image on a radar screen. If the pilot quickly maneuvers the aircraft while momentarily obscured or masked from precise radar detection by the electronic cloud, the aircraft can avoid the threat. When multiple chaff bundles are ejected, each forms a similar cloud that further confuses radar-guided weapons. Chaff itself is not explosive; however, it is ejected from the aircraft pyrotechnically using a small explosive charge that is part of the ejection system. The chaff dispenser remains in the aircraft. Two plastic end caps that are 1/8-inch thick x 1-inch x 1-inch, and a felt spacer, are ejected with the chaff. On rare occasions, the chaff may not wholly separate and may fall to earth as a clump. The distribution of chaff and flares reflected in Table 2-7 relates to all bundles used. A concentration of chaff fibers could be higher if a chaff bundle failed to function. For more detailed information on chaff, please refer to Appendix B.

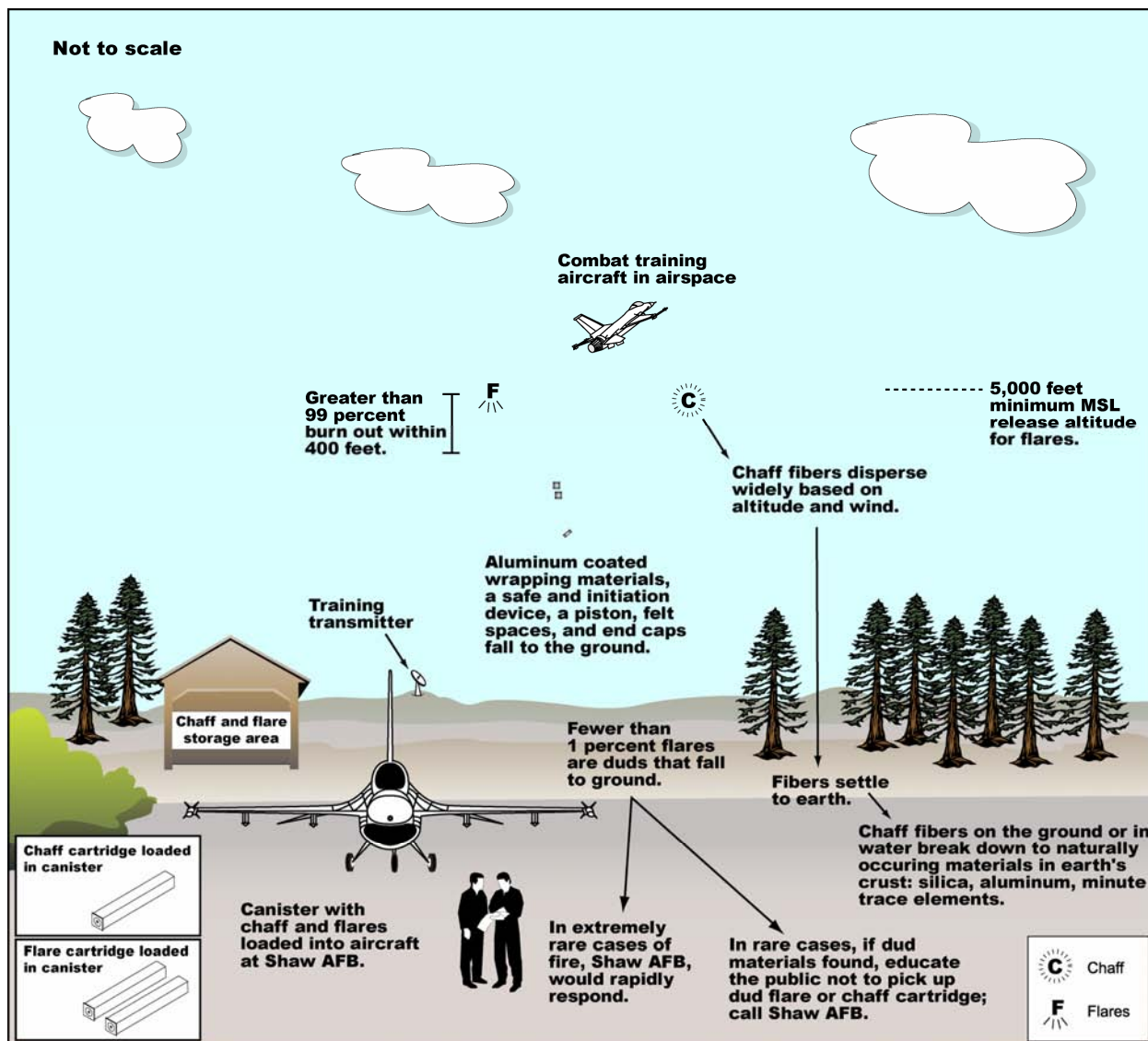


Figure 2-9. Life Cycle of Training Defensive Chaff and Flares

**Table 2-7. Annual Existing and Proposed Distribution of
Chaff and Flares in the MOAs**

<i>MOA</i>	<i>Training Chaff Bundles¹</i>	<i>Chaff/Flare Ash Concentrations Per Acre Per Year</i>	<i>Flares M-206/ MJU-7 A/B¹</i>	<i>Approximate Flare Distribution Per Year</i>
Bulldog	57,600	.13 ounces/3.85 grams	8,338/8,595	1 flare over 84 acres
Gamecock	62,400	.14 ounces/3.97 grams	6,254/6,446	1 flare over 120 acres

Sources: 1. Air Force 2003; personal communication, Byers 2005.

FLARES

Defensive flares are magnesium pellets that, when ignited, burn for a short period (3.5 to 5 seconds) at approximately 2,000 degrees Fahrenheit (°F). Because the burn temperature is hotter than the exhaust of an aircraft engine, it attracts and decoys heat-seeking weapons and sensors targeted on the aircraft. Pilots must regularly train with defensive flares under simulated threat conditions to ensure a near-instinctive reaction to deploy flares in extremely high stress conditions. Training with flares in the missions described in Table 2-1 is necessary to ensure survival by deploying defensive flares in actual combat. Two types of flares are proposed to be used for defensive training in the MOAs. They are the M-206 flare and the Multi Jettison Unit (MJU)-7 A/B flare.

The M-206 flare is a parasitic flare that is ignited in the aircraft and consumes nearly all the flare materials during deployment. M-206 residual materials that are not consumed and that fall to the ground consist of two 1-inch x 1-inch x 1/8-inch pieces of plastic, that serve as a retaining end cap and a plunger device, a 1-inch x 1-inch felt spacer, and an unburned aluminum coated wrapping material that could be from 1-inch x 1-inch up to 2-inches x 13-inches. The majority of the wrapping materials is consumed in the deployment process. The MJU-7 A/B flare ignites while being dispensed from the aircraft. After ignition, the MJU-7 A/B flare has several pieces of residual materials that fall to the ground. These materials are: a 1-inch x 2-inch x 1/8-inch end cap, a 1/2-inch x 1-inch x 2-inch hard plastic Safe and Initiation (S&I) device, a 1-inch x 2-inch x 1/2-inch piston, two 1-inch x 2-inch felt spacers, and an aluminum coated wrapping material that could be from 1-inch x 2-inches up to 3-inches x 13-inches. The majority of the used flare materials that fall have surface area to weight ratios that would not produce a significant impact when the flare material struck the ground. The one item that could fall with enough force to adversely effect an object on the ground is the MJU-7 A/B S&I device with a weight of 0.7 ounces (personal communication, Schirack 2005). The MJU-7 A/B S&I device would strike the earth with approximately the same force as a large hailstone.

During annual training, approximately 51 percent of the flares used in the Bulldog and Gamecock MOAs would be MJU-7 A/B flares and approximately 49 percent would be M-206 flares. On extremely rare occasions (approximately 0.01 percent of the flares dispensed), a flare may not ignite during ejection and would fall to the earth as a dud flare. For more detailed information on flares, refer to Appendix C.

The minimum altitudes for deploying flares during 20 FW and 169 FW training in Shaw AFB airspace exceed the 2,000 feet AGL established by the Air Force over nongovernment-owned or controlled lands (Air Force 2003). For the Gamecock and Bulldog MOAs, the minimum release altitude of 5,000 feet MSL is approximately 4,500 feet AGL (see Table 2-8). Because F-16 pilots from the 20 FW and 169 FW train throughout the airspace, flares may be released within these full range of altitudes above 5,000 feet MSL (Air Force 2003).

**Table 2-8. Altitudes for Deploying Chaff and Flares
in MOAs and ATCAAs**

<i>MOA/ATCAA</i>	AIRCRAFT OPERATIONAL ALTITUDES (FEET)		<i>Minimum Altitudes for Chaff and Flares (feet)</i>
	<i>Floor</i>	<i>Ceiling</i>	
Bulldog A/B and ATCAA ¹	500 feet AGL	27,000 feet MSL	5,000 feet MSL
Gamecock B ¹	10,000 feet MSL	18,000 feet MSL	10,000 feet MSL
Gamecock C ¹	100 feet AGL	9,999 feet MSL	5,000 feet MSL
Gamecock D and ATCAA ¹	10,000 feet MSL	22,000 feet MSL	10,000 feet MSL
Gamecock E ²	8,000 feet MSL	22,000 feet MSL	8,000 feet MSL
Gamecock F ²	5,000 feet MSL	10,000 feet MSL	5,000 feet MSL

Notes: 1. Existing airspace.

2. Proposed airspace.

Source: Air Force 2003.

RESIDUAL MATERIALS

The chaff bundles, M-206 flares, and MJU-7 A/B flares respectively represent three, five, and six pieces of residual components that could fall to the ground under the airspace.

Under the Proposed Action, approximately 57,600 chaff bundles, 8,338 M-206 flares, and 8,595 MJU-7 A/B flares would be released throughout the Bulldog MOAs annually, yielding a total of 266,060 residual materials. Given a total acreage of 1,424,031 acres beneath the Bulldog MOA, on average, one residual component is projected to fall on every 5.35 acres annually.

Under the Proposed Action, approximately 62,400 chaff bundles, 6,254 M-206 flares, and 6,446 MJU-7 A/B flares would be released throughout the Gamecock MOA annually. This total of 257,146 residual materials spread over a total acreage of 1,521,856 acres beneath the Gamecock MOAs is projected to, on average, result in one residual component falling on every 5.92 acres annually.

2.2.4 Military Training Route Utilization

No modifications are proposed to the Military Training Routes (MTRs) depicted in Figures 2-10 and 2-11. Table 2-9 includes MTR utilization by aircraft type during FY 03. These MTRs are currently used for conducting military flight training at airspeeds in excess of 250 knots between 100 feet AGL and 10,000 feet MSL depending upon the MTR. These MTRs pass through ATI airspace (current and proposed) as identified in Table 2-9. Although ATI does not involve changes in the use of MTRs, the aircraft using the MTRs are included in the evaluation of noise and cumulative effects in this EIS.

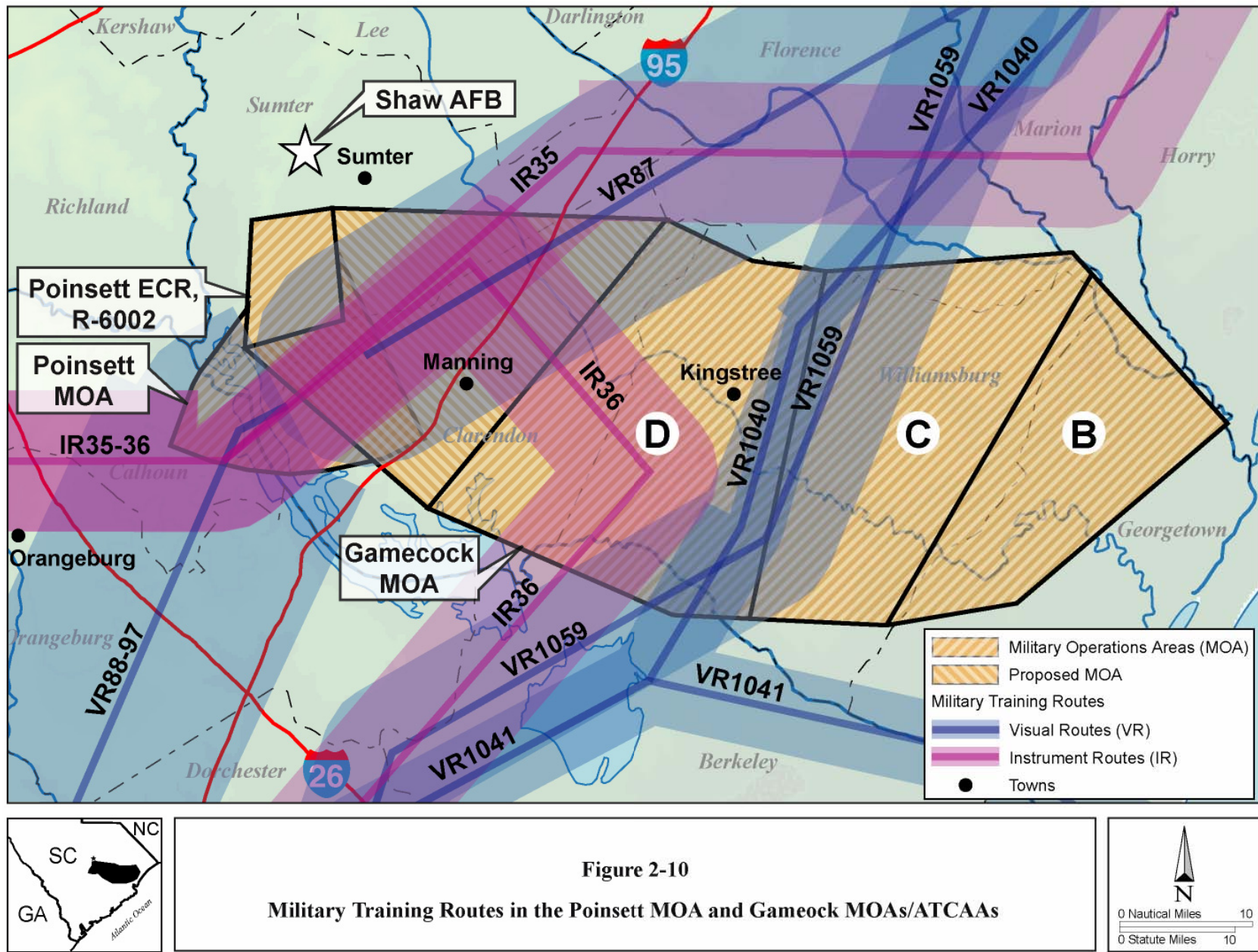


Table 2-9. MTR Utilization by Aircraft

Route	MAXIMUM FEET		MOA ¹	AIRCRAFT														Total
	Floor	Ceiling		C-17	C-130	F-15	EA-6	AV-8	F-18	T-38	T-39	F-16	A-10	T-45	T-1	S-3	T-34	
IR-035	300 AGL	4,000 MSL	G	339	1													340
IR-036	300 AGL	4,000 MSL	G	15	2										3			20
IR-074	100 AGL	7,000 AGL	B	1										1				2
VR-087	100 AGL	8,000 MSL	G			271		12	19			20	1	1				324
VR-088	100 AGL	8,000 MSL	B	5		128	3	8	90			51						285
VR-094	100 AGL	3,000 MSL	B		1	8			19									28
VR-097	100 AGL	8,000 MSL	G/B	1		21			26		9	89					1	147
VR-1059 ²	100 AGL	8,000 MSL	G/B	1		27		6	28	1	436	165	1	1	12	8		686
VR-1040	200 AGL	1,500 AGL	G	11			5	11	65			16						108
VR-1004	200 AGL	1,500 AGL	B						267		266							533

Notes: 1. G = Gamecock MOA, B = Bulldog MOA, G/B = Gamecock and Bulldog MOA.

2. On VR-1059, there are 2 F-18 and 1 C-17 operations at night. These are included in the total operations for the respective routes.

2.2.5 Airspace Management Actions

The Proposed Action includes the following methods to support joint military and civilian use of the airspace. In accordance with requirements stipulated in FAA Order 7400.2E, the FAA requires that a 3-nautical mile (NM) circle extending to 1,500 feet AGL be designated for community airports under or adjacent to the airspace. This circle would be mapped over each airport in the airspace and designated an avoidance area to exclude military training aircraft. Other management actions include:

- Unless operational requirement exists, the Poinsett MOA and the Gamecock E MOA will not be scheduled simultaneously.
- Work with FAA to schedule and use all MOAs in a manner that deconflicts military and civilian aircraft use.
- Return Gamecock B MOA to the NAS to expand general aviation airspace access and transect of coastal areas to the east of the Gamecock MOAs.

Scoping Question: *Why can't communities with airports be carved out of airspace proposal?*

Answer: *Avoidance areas would be designated by FAA around any airports under or adjacent to the modified airspace. Specific avoidance areas are currently designated around airports within or adjacent to the existing airspace. Each avoidance area is 15,000 feet high with a 3-NM radius.*

2.2.6 Overall Summary of Proposed Action

In summary, the Proposed Action would expand the size, operational altitudes, and usefulness of the Shaw AFB airspace through the following elements:

- Create a new MOA/ ATCAA (Gamecock E MOA) to join the western boundary of Gamecock D MOA/ ATCAA with Restricted Area 6002 (R-6002). Gamecock E MOA/ ATCAA would extend from 8,000 to 22,000 feet MSL.
- Lower the floor under existing Gamecock D MOA in the area where it does not overlap Gamecock C MOA and designate that portion as Gamecock F MOA. Gamecock F MOA would extend from 5,000 to 10,000 feet MSL.
- Expand the Bulldog A MOA to the east to underlie and match the existing Bulldog B MOA. The existing Bulldog A MOA has a floor of 500 feet AGL and a ceiling of 10,000 feet MSL. The Bulldog A MOA floor would match the 500 feet AGL and the ceiling would match the 10,000 feet MSL of the existing Bulldog A.
- Combine and use Gamecock C and Gamecock D MOAs concurrently and simultaneously.
- Return Gamecock B MOA to the NAS.
- Raise the ceiling on Poinsett MOA from 2,500 to 5,000 feet MSL.
- Develop electronic training transmitter sites under Bulldog and Gamecock MOAs and along the coast of South Carolina.

- Extend the use of M-206 and MJU-7 A/B flares and training chaff above 5,000 feet MSL into the new and expanded airspace.
- Implement an array of management actions including scheduling measures and deletion of Gamecock B.

2.3 ALTERNATIVE A

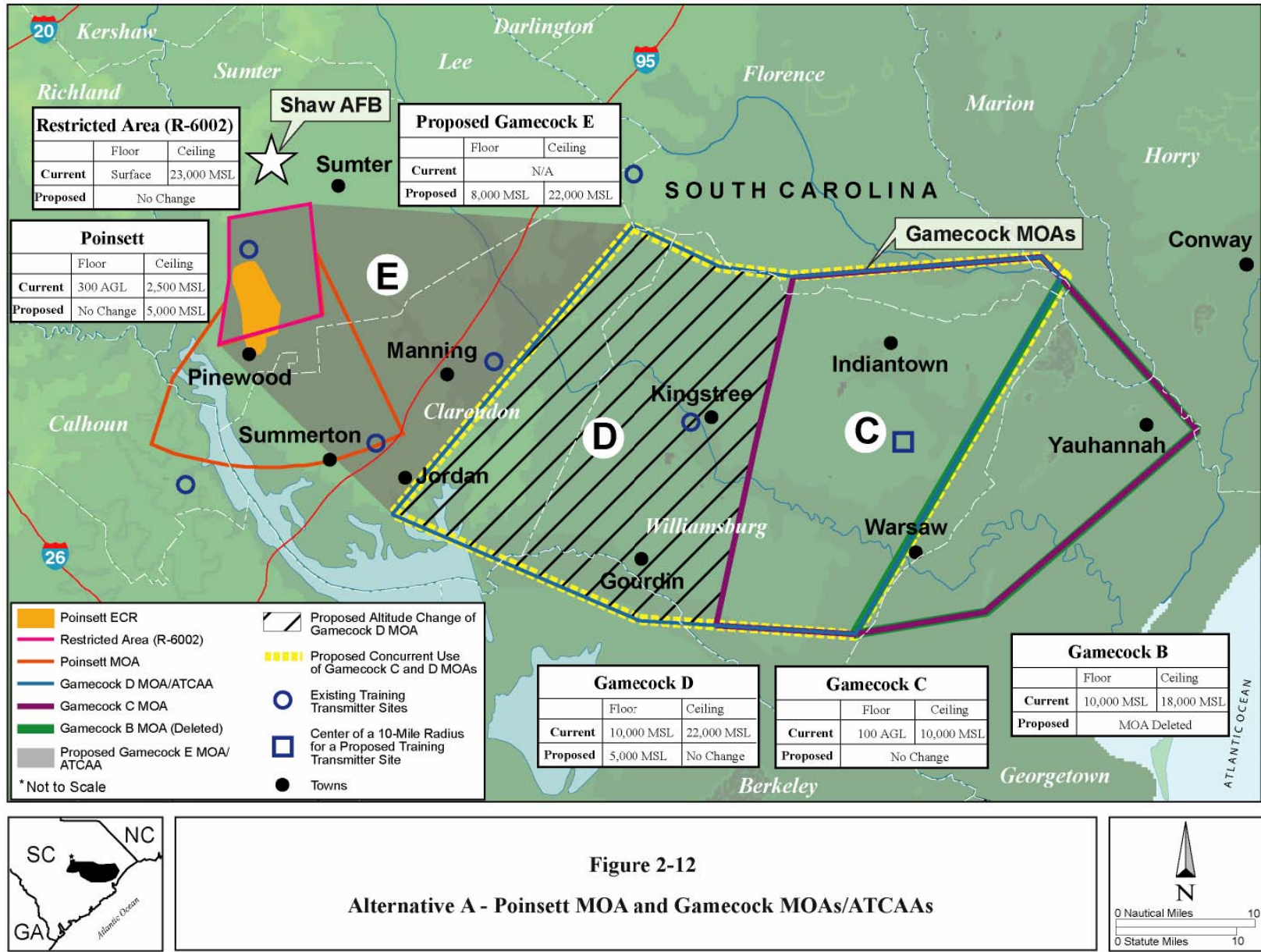
Alternative A is designed to achieve improved training in several mission required areas. Alternative A includes new airspace, airspace modifications, and procedures to support military and civilian aircraft use of the airspace. Alternative A consists of the following elements:

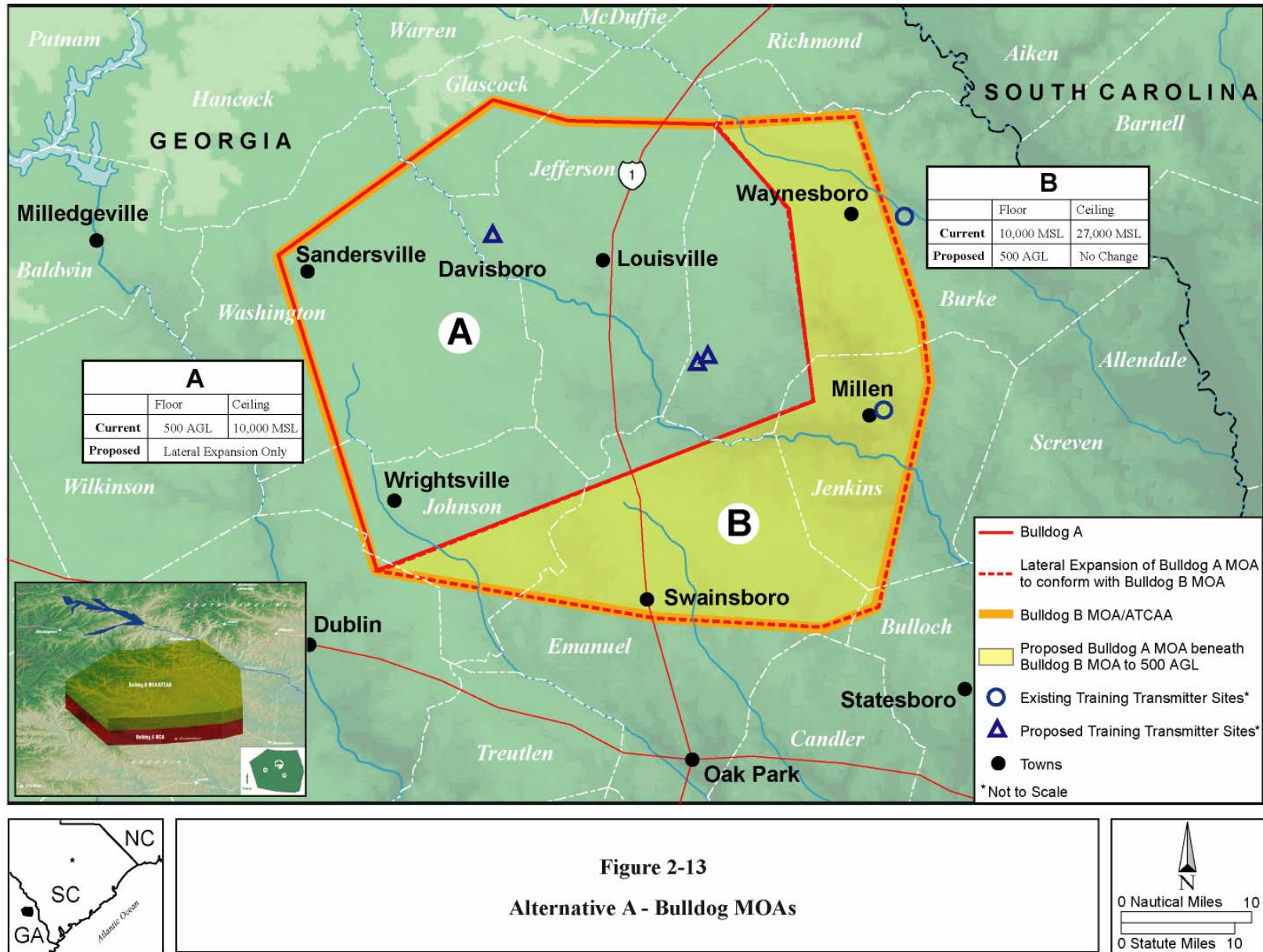
- Create Gamecock E as described under the Proposed Action.
- Lower the floor of Gamecock D in areas that do not overlap with Gamecock C, from 10,000 feet MSL to 5,000 feet MSL (Alternative A would not include creation of Gamecock F).
- Combine Gamecock C and Gamecock D for concurrent use.
- Return Gamecock B to the NAS as described under the Proposed Action.
- Raise the ceiling of Poinsett from 2,500 feet MSL to 5,000 feet MSL.
- Expand the boundaries of Bulldog A to match those of Bulldog B.
- Develop electronic training transmitter sites under Bulldog A and Gamecock C/D and along the South Carolina coast.
- Extend the use of defensive chaff and flares within new and expanded airspace above 5,000 feet MSL as described under the Proposed Action.

In addition, Alternative A includes a set of management actions to support joint military and civilian use of the airspace. The FAA requires that a 3-NM circle extending to 1,500 feet AGL be designated for community airports under or adjacent to the airspace. This circle would be mapped over each airport in the airspace and designated an avoidance area to exclude military training aircraft. Other management actions include the following:

- Unless operational requirement exists, the Poinsett MOA and the Gamecock E MOA will not be scheduled simultaneously.
- Work with FAA to schedule and use all MOAs in a manner that deconflicts military and civilian aircraft use to the maximum extent practical.
- Return Gamecock B MOA to the NAS to expand general aviation airspace access and transect of coastal areas to the east of the Gamecock MOAs.

The elements of Alternative A applicable to the Poinsett and Gamecock MOAs are presented in Figure 2-12. Figure 2-13 depicts the changes to the Bulldog MOAs under Alternative A. Aircraft operations (see Tables 2-5 and 2-6) would be essentially the same as that provided for the Proposed Action. Chaff and flare usage would be essentially as described in Table 2-7.





2.4 ALTERNATIVE B

Alternative B addresses the need to expand the size, operational altitudes, and usefulness of Shaw AFB airspace through new and modified airspace, as follows:

- Establish a new “Gamecock E” MOA with two areas, a “Gamecock E Low MOA” (8,000 to 13,999 feet MSL) and a “Gamecock E High MOA/ATCAA” (14,000 to 22,000 feet MSL), linking Gamecock D MOA/ATCAA with R-6002. This would allow the use of one MOA (either high or low), when the other MOA is unavailable.
- Lower the floor of Gamecock D MOA from 10,000 to 8,000 feet MSL in areas where it does not overlap Gamecock C MOA (Alternative B would not include creation of Gamecock F).
- Combine and use Gamecock C and Gamecock D MOAs concurrently and simultaneously.
- Continue use of Gamecock B.
- Raise the ceiling on Poinsett MOA from 2,500 to 5,000 feet MSL.
- Lower the floor of Bulldog B from 10,000 to 3,000 feet MSL. Lower the ceiling of Bulldog A from 10,000 to 2,999 feet MSL. Do not modify the boundary of Bulldog A MOA to match that of Bulldog B.
- Develop electronic training transmitter sites under Bulldog A and Gamecock C MOAs.
- Extend the use of chaff and flares within the new and expanded airspace above 5,000 feet MSL.

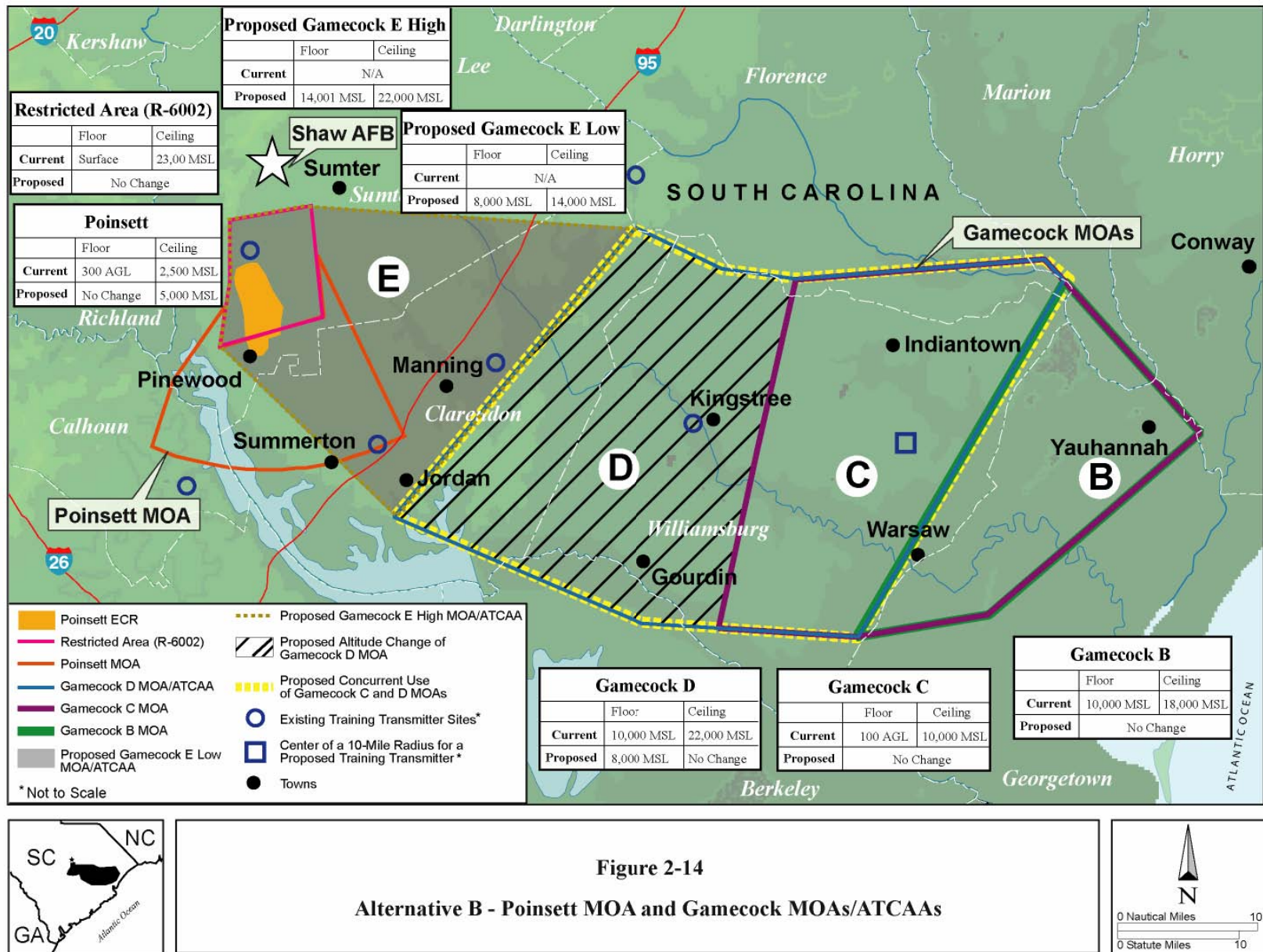
Figure 2-14 depicts the Alternative B Gamecock MOA changes and Figure 2-15 depicts the Alternative B Bulldog MOA changes.

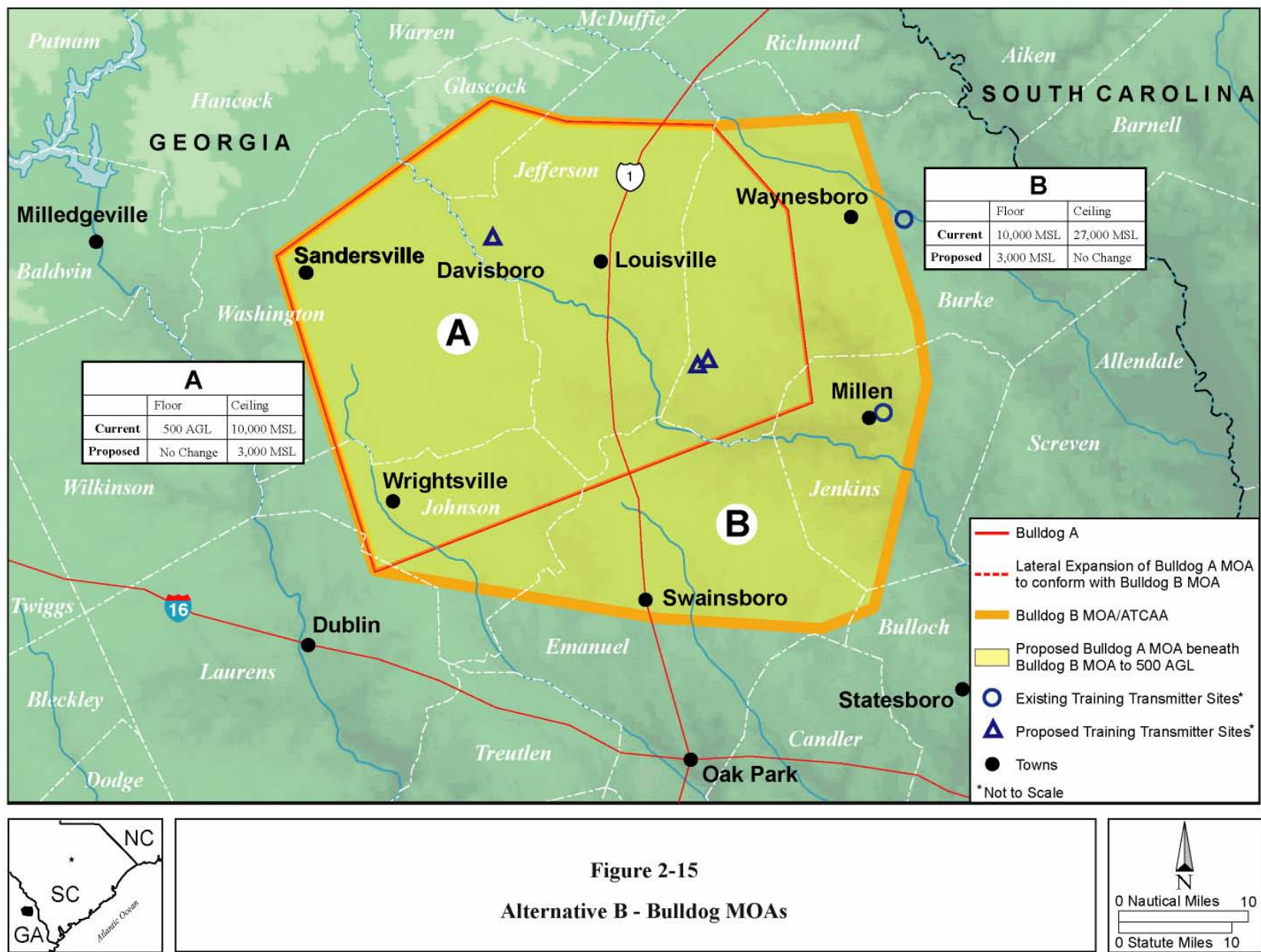
Aircraft operations data under Alternative B are essentially the same as provided in Table 2-5 and Table 2-6.

Alternative B would extend the use of chaff and flares to new and modified airspace. Chaff and flare usage under this alternative would be approximately 1 percent less than that provided in Table 2-7 due to the continued use of Gamecock B for OREs and ORIs.

Alternative B deconfliction methods to support joint military and civilian use of the airspace are as follows:

- Designate a 3-NM circle extending to 1,500 feet AGL for airports under or adjacent to the airspace. This “bubble” over each airport would be designated an avoidance area to exclude military training aircraft.
- Schedule use of the airspace in two-hour blocks to support civilian aircraft flights through the airspace.
- Do not schedule the Poinsett MOA and the Gamecock E MOA simultaneously to provide for civilian traffic in this airspace corridor.





2.5 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no airspace modifications would be undertaken with respect to Gamecock, Poinsett, or Bulldog MOAs. Likewise, no change in ATCAA airspace associated with these MOAs would be undertaken. No additional training transmitter sites would be identified in the areas underlying the airspace or along the South Carolina coast.

Figure 2-1 presents the existing and No-Action condition for the Gamecock MOAs/ ATCAA and Poinsett MOA. Figure 2-2 presents the existing and No-Action conditions for the Bulldog MOAs. Under No-Action, the 20 FW and 169 FW would continue to train to the extent possible within the airspace. The 20 FW and 169 FW would continue to be obligated to send F-16 aircraft, pilots, and maintenance personnel off station to bases that have suitable airspace for realistic stand-off distance for simulated munitions delivery and for prosecution of missions, including SEAD, DEAD, from MOA airspace into a range. Under the No-Action Alternative, most 20 FW squadrons would have few opportunities to go off station to realistically train with the full prosecution of SEAD and DEAD missions. Aircrews would potentially be deployed overseas into combat without the benefit of being proficient in maneuvers needed in combat conditions.

2.6 SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

Table 2-10 provides a summary of the airspace, transmitters, and chaff and flare usage associated with the Proposed Action and alternatives.

2.7 CRITERIA FOR DEVELOPING AND SCREENING ALTERNATIVES IN COORDINATION WITH THE FAA

The Air Force identified operational criteria and other considerations for use in identifying alternatives that met the purpose and need. Operational criteria and other considerations are presented in Section 2.7.1. Section 2.7.2 discusses the application of these criteria and considerations to formulate action alternatives in response to the ATI purpose and need. Training transmitter operational requirements and siting criteria are presented in Section 2.7.3.

Scoping Question: *Isn't there other airspace that can meet Shaw AFB needs?*

Answer: *Shaw AFB reviewed all available airspace for resolution of training requirements. Other airspace has distance, availability, or configuration constraints that would not permit Shaw AFB pilots to efficiently train for mission tasking. Shaw AFB currently uses offshore warning areas for supersonic training and Gamecock, Poinsett, and Bulldog airspaces to train for combat missions over land.*

Table 2-10. Summary of Proposed Action and Alternatives

	<i>Component</i>	<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action Alternative</i>
Gamecock MOAs	Create new Gamecock E MOA from 8,000 feet MSL to 22,000 feet MSL	YES	YES	YES Gamecock E Low from 8,000 to 13,999 feet MSL; Gamecock E High from 14,000 to 22,000 feet MSL	NO
	Create new Gamecock F MOA underneath Gamecock D in areas that do not overlap with C, from 10,000 feet MSL ¹	Gamecock F to 5,000 feet MSL	Instead, expand Gamecock D MOA to 5,000 feet MSL	Instead, expand Gamecock D MOA to 8,000 feet MSL	NO
	Combine use of Gamecock C and D	YES	YES	YES	Use independently
	Return Gamecock B to NAS	YES	YES	NO	NO
Poinsett MOA	Poinsett: Raise ceiling from 2,500 feet MSL to 5,000 feet MSL	YES	YES	YES	Ceiling remains at 2,500 feet MSL
Bulldog MOAs	Bulldog A: Expand Boundary to match up with Bulldog B	YES	YES	Instead, lower floor of Bulldog B to 3,000 feet MSL	Continue with Bulldog B ledge
New Training Transmitters	Place Under Bulldog A, and Gamecock C/D	YES	YES	YES	Continue use of available sites
	Place along Coast	YES	YES	NO	NO
Chaff and Flares	Extend use within new and expanded airspace above 5,000 feet MSL	YES	YES	YES	Continue use in existing airspace

Note: 1. MSL - Mean Sea Level; 10,000 MSL is 10,000 feet above MSL

2.7.1 Criteria and Considerations

Five airspace characteristics were identified as operational criteria to meet ATI's purpose and need. These operational criteria are listed below and described in Section 2.7.1.1.

- **Existing Airspace:** Make maximum use of existing designated military airspace.
- **Distance:** Be located at a distance such that sufficient time would be provided within the airspace to meet training objectives without refueling.
- **Proximity to Military Training Range:** Be located adjacent to or near an existing military training range for full mission training.
- **Availability:** Provide sufficient availability to meet training requirements in a timely and routine manner.
- **Configurable Airspace:** Provide airspace with a configuration and volume sufficient to meet training needs.

The Air Force also addressed two additional non-operational considerations for the airspace. These considerations are listed below and described in Section 2.7.1.2.

- **Population:** Avoid population centers to the extent possible.
- **Civilian Air Traffic:** Minimize conflict with concentrations of civilian air traffic to the extent possible.

These criteria and considerations are discussed in detail below.

2.7.1.1 OPERATIONAL CRITERIA

Airspace identified for aircrew training must meet certain operational requirements. These requirements are as follows:

EXISTING AIRSPACE

Airspace is a valuable national resource. Whenever possible, the Air Force seeks to meet the ATI purpose and need through maximum use of existing military airspace and minimum change to non-military airspace. The Air Force considered military training airspace addressed in Table 2-11 as a potential basis for developing an action proposal and alternatives.

MILITARY TRAINING RANGE

The training syllabus for F-16 aircrew of the 20 FW and 169 FW includes practice in the tactics of munitions delivery. These tactics include stand-off simulated launch, simulated threat suppression, and delivery of approved munitions. Training in munitions delivery can only be accomplished at an approved range. Such ranges are accompanied by overlying restricted airspace within which pilots maneuver to deliver munitions at selected targets. Modern airspace and ranges make use of electronic threat emitters to simulate ground based radar and anti-aircraft units. Adequate training in threat avoidance and full execution of missions require MOA airspace contiguous with the restricted airspace above a range. This allows pilots to combine the use of MOA and restricted airspace to practice the skills required for success in combat.

Scoping Question:
How did the Air Force identify alternatives?

Answer: *The Air Force used five operational criteria and two other considerations to evaluate candidate alternatives and to define the Proposed Action and alternatives.*

DISTANCE

The F-16 aircraft has a specific fuel capacity. Training airspace needs to be located such that an F-16 can launch from the base, perform multiple training missions, and return to the base with adequate fuel reserves without refueling. The result is that effective and efficient F-16 training requires airspace within approximately 100 NM of the base. Airspace that is located at a greater distance requires pilots to expend excessive amounts of fuel and flight time in transit rather than in combat training. Training airspace should be located within 100 NM from Shaw AFB to provide sufficient time within the airspace for F-16 pilot training needs.

AVAILABILITY

Airspace managers at military installations manage specific training airspace. There is considerable demand for the use of any training airspace, both by users at the controlling base, and by users at other installations. Airspace managers give first priority for access to pilots from the controlling installation on an “as required” basis. Access by other aircrews is allowed on an “as available” basis. Effective training requires that airspace be routinely available on an as required basis. Airspace to be used as a basis of defining an ATI alternative should be available on an as required basis.

CONFIGURABLE AIRSPACE

Combat training airspace needs to be sufficiently sized and configured to allow pilots to practice current tactics and make full use of F-16 capabilities (described in Section 2.1). This requires both a horizontal and vertical extent that allows for representative engagement distances with hostile threats, employment of chaff and flares, and simulated electronic combat. Adequacy of a given airspace volume depends on the configuration of the airspace. Airspace at a distance in excess of the distance criterion was reviewed to see whether any candidate alternatives with adequate volume could be used. Air Force personnel reviewed the volume and configuration of military training airspace within approximately 200 NM of Shaw AFB and McEntire ANG to determine whether any of the airspace within or even outside the distance criteria could be modified to meet the size and configuration requirements for 20 FW and 169 FW training.

2.7.1.2 OTHER CONSIDERATIONS

Two other considerations were addressed for ATI alternatives. These considerations are not requirements that must be met. Rather, they represent preferences that the Air Force feels are important factors in identifying airspace used as the basis for ATI alternatives.

POPULATION CONCENTRATIONS

It is highly desirable that military training airspace overlies areas of relatively low population density. While it is not always possible to completely avoid inhabited areas, wherever practical the Air Force attempts to configure airspace in such a way as to minimize exposure of underlying populations to military aircraft activity. Areas with lower population densities are preferred over areas with higher population densities. Avoidance areas are established within the underlying area to minimize overflight of sensitive receptors including population concentrations.

CIVILIAN AIR TRAFFIC

Commercial and general aviation, as well as the military, present competing demands on regional airspace. The volume of commercial and general aviation traffic in flight tracks potentially affected by adjusting military training airspace was quantified and the potential for deconfliction was considered in the review of potential alternatives. Wherever possible, the Air Force has sought to develop an action or alternatives to minimize disruption to commercial and general aviation.

2.7.2 APPLICATION OF CRITERIA AND CONSIDERATIONS

Identification and analysis of alternatives is a core element of the environmental process under the National Environmental Policy Act (NEPA) and 32 Code of Federal Regulations (CFR) 989. For this proposal, the Air Force worked with the FAA, the states of South Carolina and Georgia, and the public to help identify alternatives.

Table 2-11 presents airspace reviewed and compared with operational requirements and other considerations to determine which airspaces could be carried forward as a basis for alternatives to meet the purpose and need of ATI.

Table 2-11. Application of Operational Criteria and Considerations

<i>Existing MOAs</i>	<i>Approximate Distance (NM one way)</i>	OPERATIONAL CRITERIA				OTHER CONSIDERATIONS	
		<i>Distance (Maximize Training Time)</i>	<i>Near Existing Military Training Range</i>	<i>Available As Required</i>	<i>Configurable Airspace</i>	<i>Relatively Low Population Density</i>	<i>Potential Civilian Air Traffic</i>
Snowbird	180	NO	YES	NO	NO	YES	YES
Hatteras MOA	180	NO	YES	NO	NO	YES	YES
Quickthrust E, F, G, H, I, J, L, M, N	140	NO	YES	NO	NO	YES	YES
Gator 1, 2	140	NO	YES	NO	NO	YES	YES
Seymour Johnson Echo	140	NO	YES	NO	NO	YES	YES
Fort Stewart B1, B2, C1, C2	130	NO	NO	NO	NO	YES	YES
Bulldog D	120	NO	NO	YES	NO	YES	NO
Fort Bragg North Area A, B	100	YES	NO	NO	NO	YES	YES
Fort Bragg South Area A, B	90	YES	NO	NO	NO	YES	YES
Beaufort 1, 2, 3	70	YES	YES	NO	NO	YES	YES
Gamecock A, B, C, D, I	40	YES	YES	YES	YES	YES	NO
Bulldog A, B	90	YES	NO	YES	YES	YES	NO
Poinsett	10	YES	YES	YES	YES	YES	NO

A total of 13 airspace blocks were evaluated in terms of the operational criteria and other considerations. All 13 existing airspace blocks were considered in screening to determine whether an existing airspace just outside the distance criterion could meet all other criteria. All of these existing airspace blocks are in areas of relatively low population concentrations. Six blocks were found to lie within the required 100-NM distance of Shaw AFB and McEntire ANG: Fort Bragg North MOAs, Fort Bragg South MOAs, Beaufort MOAs, Gamecock MOAs, Bulldog A and B MOAs, and Poinsett MOA. Of these airspace blocks, only Gamecock, Bulldog, and Poinsett MOAs could be scheduled on an as required basis.

Civilian air traffic in the Gamecock, Bulldog, and Poinsett areas was evaluated as being relatively low, although modifications to these airspaces could result in some disruption to civilian air traffic.

Of the airspace that met all of the foregoing criteria and considerations, only Poinsett MOA lay immediately adjacent to airspace overlying a combat training range. Gamecock MOA lies relatively close to the same training range (Poinsett Electronic Combat Range). Modifications to the airspace structure of the Poinsett and Gamecock MOAs were identified as providing the best opportunity for meeting the purpose and need of ATI. Bulldog MOAs meet all selection criteria except for adjacency to a training range. While the absence of a training range limits the use of Bulldog A and B for meeting all aspects of the purpose and need, the fact that the airspace meets the other criteria makes it a location suitable for most training activities. Modification to the Bulldog MOAs, in combination with changes to the Gamecock MOAs, would substantially improve air combat training under the purpose and need.

2.7.2.1 TRAINING TRANSMITTER OPERATIONAL REQUIREMENTS AND SITING CRITERIA

The identification of new transmitter sites utilizes a set of criteria independent of those used to identify appropriate airspace. These criteria are as follows:

- *Under or near airspace.* The transmitter is designed to realistically simulate a battlefield environment and successfully accomplish mission training, especially for the SEAD and DEAD missions. Locations for transmitter sites should be approximately 15 to 20 miles apart where possible and either directly under or approximately 40 NM from the MOAs to create varied training threats that simulate combat conditions.
- *Distance from roads (access/power).* Siting near existing roads and power lines reduces cost and disturbance to environmental resources.
- *Existing cleared area.* An existing cleared area, of approximately 15 acres, improves the range of the transmitter while reducing the extent of clearing or other disruption to the existing environment.
- *Distance from environmentally sensitive areas.* Avoidance of environmental sensitive areas such as wetlands, wildlife refuges, or other natural areas reduces the potential effects on sensitive resources.

- *Elevated terrain.* An area on a slight rise having an unobstructed view permits the transmitter to have a greater line of sight into the training airspace, thereby improving its effectiveness as a training aid.

These selection criteria have been applied to select existing and potential sites and would be applied to areas within South Carolina and Georgia to identify additional potential locations for developing training transmitter sites.

2.7.2.2 APPLICATION OF SITING CRITERIA TO TRAINING TRANSMITTER SITES

The training transmitter alternative sites are proposed to be located in areas that are on disturbed ground with access and power and that avoid, to the extent possible, low-lying areas, such as wetlands. As potential sites are identified that meet the distance, location, and siting criteria, they will be evaluated for potential environmental consequences in comparison with the environmental aspects identified in this EIS. Should there be a change in the size of a site, the general location identified in this EIS, the topographic requirements, or in regulations governing such sitings, a subsequent Environmental Impact Analysis Process (EIAP) will address those changes.

2.8 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Throughout the alternative identification and screening process, as well as during public scoping, other candidate alternatives were considered to support the ATI purpose and need (as described in Sections 1.3 and 1.4). In accordance with Air Force Instruction (AFI) 13-201, Shaw AFB sought to modify existing SUA rather than create any separate new SUA to meet training requirements specified in Chapter 1.0. The Air Force and the FAA considered two additional candidate alternatives to meet training requirements for F-16 aircrews at Shaw AFB and McEntire ANG. These candidate alternatives were not carried forward as operationally viable alternatives in this EIS. These candidate alternatives were as follows:

- **Establish a smaller corridor, or stationary altitude reservation (ALTRV), to link Gamecock D MOA with Poinsett ECR (R-6002).** A corridor would be 10 NM wide with the northern boundary of the ALTRV corridor connecting the northwestern corner of Gamecock D MOA with the northeastern corner of R-6002. A corridor would allow some limited airspace for transitioning in a tactical manner from the Gamecock MOAs to the Poinsett ECR, but would not offer the maneuvering airspace required for realistic SEAD/DEAD or strike package training (see Figure 2-4). This alternative was examined but not carried forward for analysis because it did not provide airspace that met the specific training requirements.
- **Allow the full use of the Gamecock D MOA as published (i.e., 10,000 feet MSL – Flight Level [FL] 180), while preserving the FL220 ATCAA.** This alternative would improve existing airspace and the training capability for pilots who are currently restricted procedurally to a 12,000 foot MSL floor in Gamecock D. This alternative was not carried forward because the maneuvering airspace would continue to be constrained

and no simulated diving deliveries or target acquisition passes could be made. This alternative would preclude effective DEAD tactics training in this area. Because this alternative would not optimize existing training airspace and would not focus on the need for specific training requirements, it was not carried forward for further analysis.

2.9 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This ATI EIS has been prepared in accordance with NEPA (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) Regulations (40 CFR § 1500-1508), and 32 CFR 989, *et seq.*, *Environmental Impact Analysis Process* (AFI 32-7061). NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA ensures that environmental information is available to the public, agencies, and the decision-maker before decisions are made and before actions are taken.

The environmental analysis process includes public and agency review of all information pertinent to the Proposed Action and alternatives, and provides a full and fair discussion of potential consequences to the natural and human environment. A series of community outreach/scoping meetings were conducted to involve the public and agencies, to identify possible consequences of an action, and to focus analysis on environmental resources potentially affected by the Proposed Action or alternatives.

Reasonable alternatives to the Proposed Action as well as the No-Action Alternative are also evaluated in the Draft EIS. In this Draft EIS, the No-Action Alternative means that there would be no modifications or additions to the current airspace managed by Shaw AFB. As described in Section 2.5, this would maintain training conditions as they are today. The Air Force analyzes alternatives to ensure that fully informed decisions are made after review of the comprehensive, multidisciplinary analysis of potential environmental consequences. Compliance with NEPA guidance for preparation of an EIS involves several critical steps depicted in Figure 2-16 and summarized below. This EIS process described below is also intended to satisfy the NEPA requirements for the FAA. FAA's federal actions are dependent upon the SUA proposal. Figure 2-17 depicts the FAA non-regulatory SUA standard process.

1. *Announce that an environmental analysis will be conducted.* Announcements were published in local newspapers September 16-22, 2004 and, following community outreach/scoping meetings, a Notice of Intent for this EIS was published in the *Federal Register* on December 3, 2004.

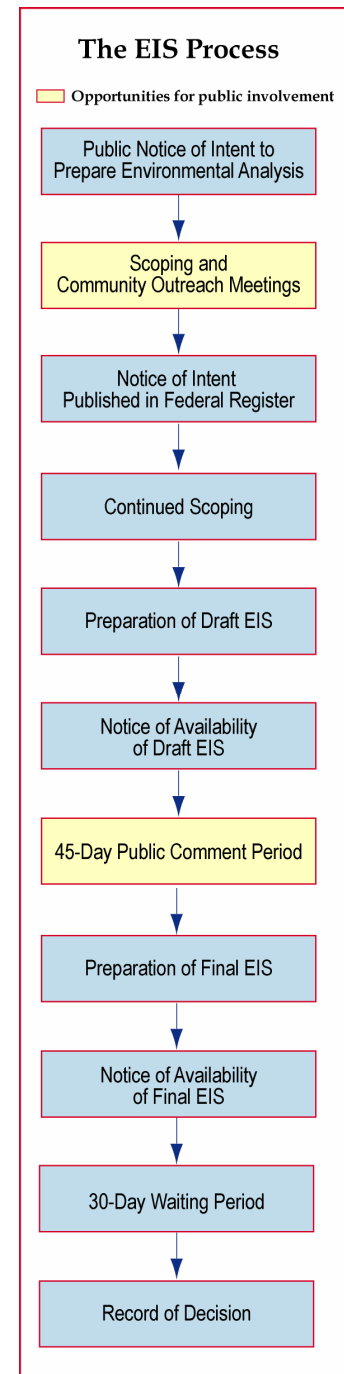


Figure 2-16. EIS Process

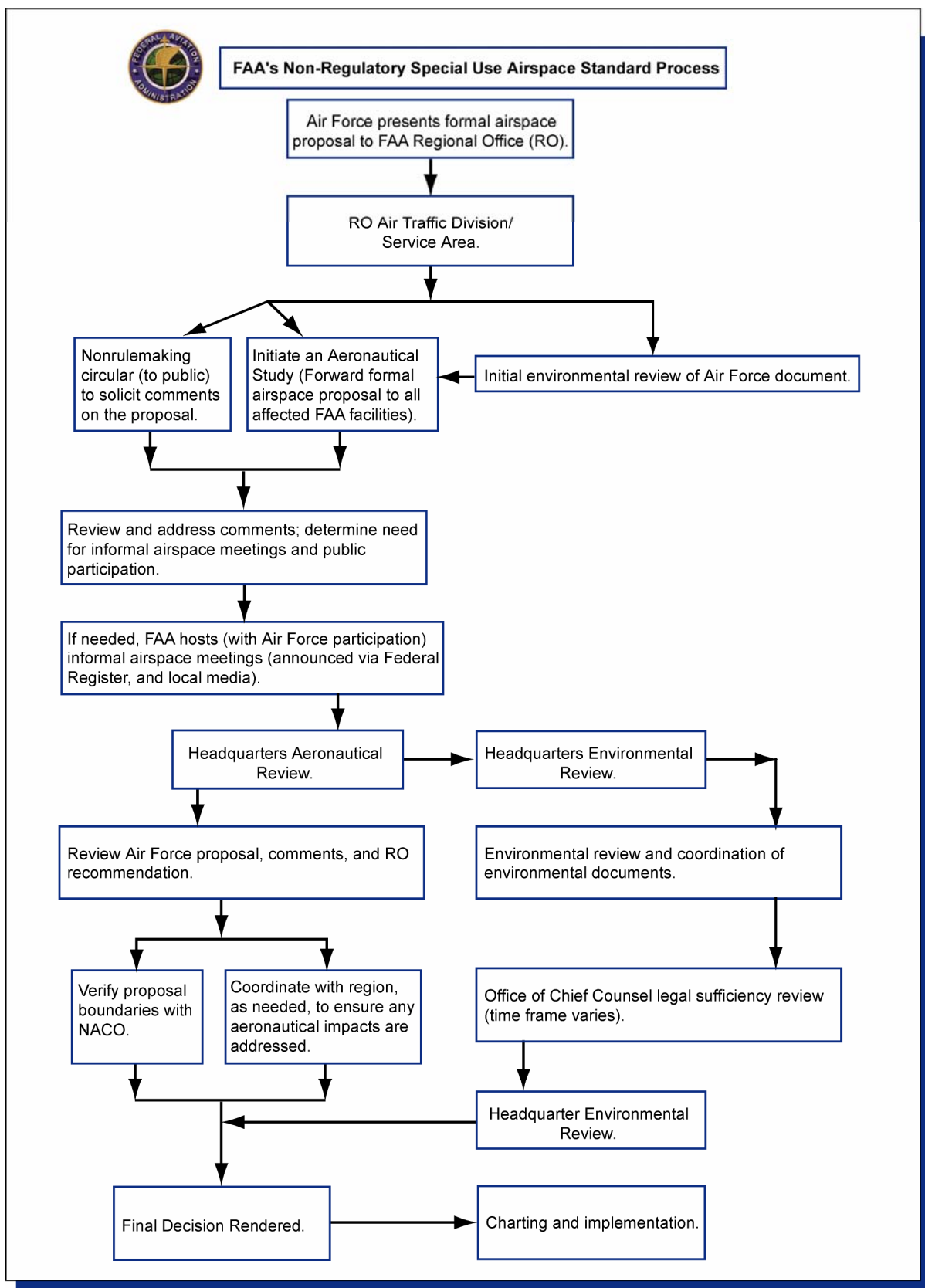


Figure 2-17. FAA's Non-Regulatory Special Use Airspace Standard Process

2. *Conduct community outreach/scoping meetings.* This step identifies the relevant issues to be analyzed in depth and eliminates issues that are not relevant. Scoping for this environmental analysis ran from August 26, 2004 through January 5, 2005. Throughout the 4-month period, the Air Force actively solicited comments through press releases, newspaper ads, public service announcements, flyers, letters, and postcards to the public, local governments, federal and state agencies, tribes, airports, and pilot associations. These entities were solicited to ensure that their concerns and comments about the proposal were included in the analyses. In August 2004, the Air Force initiated the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) and submitted letters to airports, local, state, tribal and federal agencies informing them of the Air Force's intent to prepare this EIS. Sample IICEP letters and a list of IICEP recipients are contained in Appendix A. Community outreach/scoping meetings were held in Manning, Kingstree, and Georgetown, South Carolina, and Millen, Georgia, to present details about the proposal, to explain the NEPA process, and to provide opportunities for public and agency involvement (refer to Section 2.9.2.1). Approximately 35 members of the public and agency representatives attended the meetings. In addition to receiving verbal and written comments at the scoping meetings, the Air Force also received written comments from the public and agencies through the mail. To the extent possible, these scoping comments have been used to shape the alternatives and analysis and focus the potential environmental issues addressed in this Draft EIS (see Section 2.9.2.1). Comments on the Proposed Action and alternatives will continue to be accepted throughout the environmental process.
3. *Prepare a Draft EIS.* The Draft EIS is a comprehensive document for public and agency review. This Draft EIS describes the ATI purpose and need, explains the Proposed Action and alternatives, presents the existing conditions in the region potentially affected, and provides analysis of the potential environmental consequences of the Proposed Action and each alternative, including the No-Action Alternative. This Draft EIS has been distributed to agencies and members of the public who have requested copies. To ensure the widest dissemination possible, copies were also distributed to regional libraries in the potentially affected area. The 45-day public comment period begins when the Notice of Availability (NOA) for this Draft EIS is filed in the *Federal Register*.
4. *Public/Agency Review.* The 45-day public comment period is to provide the public and agencies the opportunity to review the Draft EIS and to provide comments on the analysis. This comment opportunity includes a series of public hearings held during the comment period. The hearings give the public and agencies an opportunity to verbally comment on the Draft EIS after their review and evaluation of the document. The hearings provide direct feedback to the Air Force from the public and agencies.

Scoping Question: What was the notification of public meetings to explain ATI?

Answer: Newspaper display ads, posted flyers, press releases, public service announcements, and letters to agencies and state clearinghouses identified public meeting times and locations. These media and mailing lists were also used to notify the public and agencies about the Draft EIS availability and public hearings.

Comments received during the public comment period are incorporated into the Final EIS. Written comments submitted at public hearings and those received through the mail by the Air Force are given equal consideration in the preparation of the Final EIS.

5. *Prepare a Final EIS.* The Final EIS will be prepared following the public comment period and will address comments within the scope of the EIS submitted during the public comment period or presented at public hearings. All public hearing testimony and written comments received are included in the Final EIS. The Final EIS is a revision of the Draft EIS to reflect public and agency comments, the Air Force's responses, and additional information received from reviewers. The Final EIS provides the decisionmaker with a comprehensive review of the potential environmental consequences of selecting the Proposed Action or an alternative. The NOA is published in the Federal Register to announce availability of the Final EIS.
6. *Issue a Record of Decision.* The final step in the NEPA process is approval of the Record of Decision (ROD). The NOA begins a 30-day waiting period before the ROD is signed. The ROD identifies which action has been selected by the Air Force decision-maker and what management actions or other measures would be carried out to reduce, where possible, adverse impacts to the environment.

2.9.1 Scope of Resource Analysis

The Proposed Action and action alternatives have the potential for effects to certain environmental resources. Specific environmental resources with the potential for environmental consequences include airspace management and air traffic control (including airport traffic), noise, safety, air quality, physical resources (including visual), biological resources, cultural resources, land use, socioeconomics, and environmental justice. Potentially affected environmental resources on lands underlying the Poinsett, Gamecock, and Bulldog MOAs are analyzed. The Proposed Action and action alternatives involve development of training transmitter sites, and so include ground-disturbing activities and construction labor requirements. These activities could potentially affect biological, cultural, land use, air quality, safety, or socioeconomic resources. The South Carolina and Georgia State Historic Preservation Offices (SHPOs) will be contacted regarding cultural resources as training transmitter siting alternatives are further developed.

Chapter 3.0 presents the affected environment followed by an analysis of environmental consequences for environmental resources in potentially affected areas underlying Gamecock, Bulldog, Poinsett MOAs, and the coastal areas where training transmitters could be established. Section 2.10 provides a summary comparison of environmental consequences.

2.9.2 Public and Agency Involvement

As noted above, the Air Force initiated early public and agency involvement in ATI. The Air Force distributed IICEP letters, published newspaper advertisements, posted flyers, and sent out press releases. These announcements solicited public and agency input on the proposal. The Air Force announced in the press the intent to conduct an environmental analysis for the proposal and invited the public and interested government agencies to attend community

outreach scoping meetings. The announcement in the *Federal Register* of the intent to prepare an EIS also requested public and agency input. Issues identified by the public and government entities during this process are discussed below.

2.9.2.1 ISSUES IDENTIFIED DURING THE SCOPING PROCESS

Table 2-12 identifies the location of the four community outreach scoping meetings conducted as part of the environmental analysis. Comments and discussions during scoping meetings and submitted written comments resulted in identifying issues related to the ATI proposal and are presented in Table 2-13. These issues are discussed in the baseline conditions and resource analysis in Chapter 3.0. The scoping process included questions on changes to Instrument Flight Rule (IFR) procedures and airspace communication that are noted in this EIS, although resolution of such procedures and communication is outside of the scope of this EIS. Both the Air Force and FAA continue to coordinate on procedures and communications through Letters of Agreement (LOA).

Table 2-12. Community Outreach Scoping Meetings

<i>Date</i>	<i>Time</i>	<i>Location</i>
September 27, 2004 – Monday	5:30 – 7:30 p.m.	Manning High School Lecture Hall, Manning, South Carolina
September 28, 2004 – Tuesday	5:30 – 7:30 p.m.	Kingstree Senior High School Cafeteria, Kingstree, South Carolina
September 29, 2004 – Wednesday	5:30 – 7:30 p.m.	JB Beck Middle School Auditorium, Georgetown, Georgia
September 30, 2004 – Thursday	5:30 – 7:30 p.m.	Millen Community House, Millen, Georgia

Some environmental resources were not carried forward for evaluation as separate sections in this EIS because it was determined that implementation of the Proposed Action or any of the alternatives would be unlikely to affect these resources. These resources are hazardous materials and waste management, ground transportation, and visual resources. A brief explanation of the reasons why these resources were not expected to be impacted is provided below:

Hazardous Materials and Waste Management: The implementation of the Proposed Action or alternatives would not increase the use of any hazardous materials. The training transmitters are electrically powered and require a minimum of petroleum products in maintenance. Construction associated with the transmitter sites would not generate substantial solid or hazardous waste. Construction effects are addressed in physical and biological resource sections.

Table 2-13. Public Scoping Issues by EIS Section

<i>Issue Raised</i>	<i>EIS Section Addressing Issue</i>
EIS Process	
Concern decision has already been made	1.5, 2.9
Concern about notification and outreach meetings	2.9
Inquiry as to who has the final decisionmaking authority	1.5
Request for a plan for the Proposed Action and environmental analysis	2.9
Concern that MOA Gamecock E “bridge” will be precedent setting	2.2.1
Purpose and Need	
Assertion that other airspace can meet Shaw AFB needs	2.7
Concerns that ATI is designed to meet future Shaw AFB needs	1.1
Addressing Additional Alternatives	
Consideration of other alternatives or airspace to meet Shaw AFB training needs	2.7
Request that towns with airports be carved out of airspace proposal	2.2.6
Airspace Management and Air Traffic Control	
Concerns about civil aircraft traffic crossing the new airspace	3.1.3.1
Lack of general aviation flight options during bad weather	3.1.2
Concern for medical flights through proposed airspace changes	3.1.2, 3.1.3.1, 3.9.3.1
Concerns that commercial and private flights would not be able to use the Instrument Landing System (ILS) to approach airports under the airspace	3.1.3.1
Noise	
Concerns about effect upon quality of life and rural economy	3.2.3.1, 3.9.3.1
Concern about the presence of low-flying military aircraft and associated noise at recreation sites, including Magnolia Springs State Park, Georgia	3.8.3.1
Safety	
Concerns about pilot safety where general aviation is “funneled”	3.1.2.1, 3.3.3.1
Safety concerns for agricultural aviation	2.2.6, 3.9.3.1
Physical Resources	
No specific issues raised	
Biological Resources	
Concerns about low-level flights near wood storks and bald eagles	3.6.3.1
Concerns about collisions between aircraft and migratory birds	3.1.2, 3.3.3.1
Cultural Resources	
No specific issues raised	
Land Use	
Concerns about cell phone interference from training transmitters	3.8.3.1
Concerns that military airspace would affect airport-based industrial parks, farms, or state parks	3.8.3.1, 3.9.3.1
Socioeconomics	
Concerns about effects on economics and economic development in currently economically distressed communities from airspace changes	3.9.2, 3.9.3.1
Concerns that community investments (e.g., hospitals, airports) would be affected by ATI	3.9.3.1
Concerns that pilot training schools would be affected by ATI	3.9.3.1
Environmental Justice	
No specific issues raised	

The use of chaff and flares would continue and most chaff or flare residual materials or debris do not constitute hazardous materials or waste. Except for the extremely rare dud flare, residual materials are not hazardous. The Munitions Rule provides that munitions used for the training of military personnel are not solid waste and not subject to Resource Conservation and Recovery Act regulation. The United States Environmental Protection Agency (USEPA) views such training activities as constituting the normal use of the product rather than waste disposal. Since the chaff or flare unit was used for its intended training purpose, the residual material that falls to the ground would not be considered hazardous waste. The effects of residual material or debris from deployment of chaff and flares are addressed in the discussions of safety, physical resources, and socioeconomics.

Ground Transportation: The implementation of the Proposed Action or an alternative would not involve an increase in base personnel or an increase in the use of the road or railroad systems in the study area and would not have the potential to interfere with the movement of vehicles. Training transmitter traffic would be minimal and generally indistinguishable from local truck and auto traffic. Transportation issues regarding aircraft, both commercial and general aviation, are addressed in the environmental discussions of airspace and socioeconomics.

Visual Resources: The implementation of the Proposed Action or alternatives would not affect the visual environment. Military training jet aircraft have been common sights in the MOAs for over 50 years. The new and modified airspace locations are within close proximity to or under areas already in use by military aircraft for training, and therefore, the appearance of military aircraft would not be expected to change the existing viewshed. The training transmitter sites would be located in remote areas, on rural private property, and would likely not be visible from a public right-of-way. Chaff and flare residual materials are addressed in airspace, physical resources, and socioeconomics.

2.9.2.2 FAA IMPACT ANALYSIS CATEGORIES

When the FAA (participating in the ATI EIS as a cooperating agency) is the lead agency or proponent of an action, it considers analysis of an array of environmental resources similar to the Air Force's. FAA action on the ATI proposal constitutes an FAA non-regulatory SUA process (refer to Figure 2-17). Table 2-14 lists those resource analysis categories, as identified in FAA Order 1050.1E (revised 2004), and correlates them with the resources discussed in the ATI EIS. FAA Order 1050.1E, Section 6.1c, discusses FAA's requirement to satisfy 49 USC, Subtitle I, Section 303(c), commonly referred to as Section 4(f). This act mandates that special effort be made to preserve the natural beauty of the countryside and Public Park and recreation lands, wildlife and waterfowl refuges, and historic sites in implementing transportation projects. Section 6.1c of the Handbook exempts designation of airspace for military flight operations from Section 4(f). Specifically, the Department of Defense reauthorization in 1997 provided that "No military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, USC" (P.L. 105-85, November 18, 1997).

**Table 2-14. Impact Analysis Categories Identified
in FAA Order 1050.1E (2004)**

<i>FAA Impact Analysis Categories</i>	<i>ATI EIS Environmental Resource</i>	<i>Summary</i>
Air Quality	Air Quality	Essentially no change in air quality in existing airspace. Minor emission increases in new and expanded airspace.
Coastal Resources	Included in Land Use	Training transmitter sites near coastline; no changes to coastal resources anticipated.
Compatible Land Use	Land Use and Recreational Resources	Proposed Action and alternatives occur in areas already overflowed by aircraft. Current land uses are not incompatible with existing levels of noise. Training transmitters compatible with agricultural land uses.
Construction Impacts	Included in Physical Resources	Minimal construction activities associated with Proposed Action or alternatives.
Farmlands	Physical Resources and Land Use	Potential to convert agricultural uses to non-agricultural uses; minor impacts associated with transmitter and road construction.
Fish, Wildlife, and Plants	Biological Resources	Training transmitter sites to avoid sensitive species; additional surveys required.
Floodplains	Physical Resources	Training transmitter sites to avoid floodplains.
Hazardous Materials, Pollution Prevention, and Solid Waste	Included in Safety and Physical Resources	No expected increase in use of hazardous materials or generation of solid waste.
Historical, Architectural, Archeological, and Cultural Resources	Cultural Resources	Proposed Action and alternatives do not include demolition or on-the-ground effects; noise impacts are not anticipated.
Light Emissions and Visual Impacts	Not carried forward for further analysis as a separate topic; see also Land Use and Recreational Resources	Aircraft would continue to use fuel under all alternatives. Minor increases in electrical use for transmitters and minor loss of land resources to transmitter construction.
Natural Resources, Energy Supply, and Sustainable Design	Included in Land Use and Physical Resources	Aircraft would continue to use airspace and fuel under all alternatives; transmitters use electricity.
Noise	Acoustic Environment	Little change under existing airspace. Noticeable but minor increases in noise levels under new airspace and expanded airspace. Transient noise associated with training transmitters.
Secondary (Induced) Impacts	Discussed in Cumulative Impacts section (Chapter 4.0)	Secondary impacts are not anticipated.
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	Socioeconomics, Safety, and Environmental Justice	No additional impacts to human, social, or economic resources are anticipated.
Water Quality	Physical Resources	Proposed Action or alternatives not expected to impact water quality
Wetlands	Biological Resources	Training transmitter sites to avoid wetlands
Wild and Scenic Rivers	Land Use and Recreational Resources	The Black River, a designated Scenic River, is already overflowed by training aircraft. No additional impacts are anticipated.

2.9.3 Regulatory Compliance and Permit Requirements

This EIS has been prepared to satisfy the requirements of NEPA (Public Law [P.L.] 91-190, 42 USC 4321 *et seq.*) as amended in 1975 by P.L. 94-52 and P.L. 94-83. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. In addition, this document was prepared in accordance with Section 102 (2) of NEPA, regulations established by the CEQ (40 CFR 1500-1508), AFI 32-7061, (i.e., 32 CFR Part 989), and FAA Order 7400.2. Any change to chartered airspace is the responsibility of the FAA. This responsibility is discussed in Section 1.5.

This analysis of environmental resources considered all applicable federal, state, and local regulations in Chapter 3.0 of this document. Certain areas of federal legislation, such as the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA), have been given special consideration. Other regulatory or permit requirements are not anticipated for the Proposed Action or alternatives.

Implementation of the Proposed Action or an alternative will involve coordination with several agencies. Compliance with the ESA requires communication with the United States Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this consultation is to request a determination of whether any of these species occur in the region of influence of the Proposed Action. If any of these species are present, a determination of the potentially adverse effects on the species is made. Should no species protected by the ESA be affected by the Proposed Action, no additional action is required. No adverse effects are anticipated. Letters were sent to the appropriate USFWS offices as well as state agencies, informing them of the Proposed Action and alternatives and requesting data regarding applicable protected species. Appendix A includes copies of relevant coordination letters sent by the Air Force.

The preservation of cultural resources falls under the purview of SHPO, as mandated by the NHPA and its implementing regulations. A letter was sent to the South Carolina and Georgia SHPOs and the Catawba Indian Nation and the Eastern Band of Cherokee Indians informing them of the Proposed Action and alternatives (Appendix A). Further communication is included as part of the Draft EIS review process.

This EIS has been prepared in compliance with NEPA; other federal statutes, such as the Clean Air Act (CAA) and the Clean Water Act (CWA); Executive Orders (EOs); and applicable state statutes and regulations. Table 2-15 summarizes these applicable federal, state, and local permits and the potential for change to the permits due to the Proposed Action or an alternative. No new permits are expected to be required to implement the Proposed Action or alternatives.

Table 2-15. Environmental-Related Permitting

<i>Permit</i>	<i>Resource</i>	<i>Proposed Action</i>
Part B, Resource Conservation and Recovery Act Corrective Action Permit (Shaw AFB)	Hazardous Waste	No change in hazardous waste.
Interim Status Part B, Subpart X (Poinsett ECR)	Operations	No on the ground activities on Poinsett ECR.
Title V Air Operating Permit	Air	No change to air emissions.
Public Water System Operating Permit (Shaw AFB)	Water	No construction on Shaw AFB.
Public Water System Operating Permit (Poinsett ECR)	Water	No construction on Poinsett ECR.
General National Pollutant Discharge Elimination System (NPDES) Permit	Storm Water	Construction associated with training transmitters.
Individual NPDES Permit	Storm Water	

2.10 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVES

Table 2-16 compares the environmental consequences for the Proposed Action and alternatives. This summary table is derived from the detailed consequences sections for each environmental resource presented in Chapter 3.0.

Table 2-16. Summary of Impacts by Resource
(Page 1 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
AIRSPACE MANAGEMENT AND AIR TRAFFIC CONTROL			
<p>Modification to existing MOA airspace and creation of new MOA airspace would require non-rule-making action by the FAA.</p> <p>Creating Gamecock E MOA and lowering the floor of Gamecock D MOA to become Gamecock F MOA were identified as potentially serious impacts to civil aviation by pilots at scoping meetings. Although there would be airspace above and below the new MOAs and airspace controllers have complete coverage of aircraft in this airspace, a greater concentration of civil aircraft could occur in the vicinity of the new airspace due to the “funneling” of other traffic around the SUA. The floor of Gamecock F could especially affect air taxi traffic by requiring civil aviation to fly below 5,000 feet MSL or use see-and-avoid rules to traverse the MOA.</p> <p>Extension of the 500 foot AGL floor of Bulldog A beneath Bulldog B was identified as a concern by communities with airports under the expanded airspace. A 3-NM by 1,500-foot AGL avoidance area would be designated around airports. Existing airports under Bulldog A have such an avoidance area. Analogous avoidance areas with altitude and spatial boundaries would be created around communities and other noise sensitive areas within the expanded airspace. Airports with IFR capabilities would be under air traffic control and would not be affected. No significant airspace impacts are anticipated with the avoidance areas charted.</p> <p>Life-flights to regional hospitals would be given precedence by Air Traffic Controllers, and would be expected to remain unimpeded by changes to military training airspace.</p> <p>The likely number of aircraft requiring air traffic control service from FAA and supporting Air Force controllers is within their ability to deconflict in the changed airspace.</p> <p>Deconfliction of military and civil traffic in the extended Bulldog A would be managed as under current conditions in Bulldog A.</p> <p>Poinsett MOA changes would be scheduled to not impact civil aviation.</p> <p>Training chaff is specifically manufactured to not interfere with FAA ATC radars and would not create airspace management impacts. Use of flares and training transmitter sites would not impact civil air traffic or the ATC system.</p>	<p>The environmental consequences to commercial and general aviation, local airports, and airspace management would be the same as described for the Proposed Action. The boundaries of the Bulldog A and B MOAs would be made conformal as described in the Proposed Action.</p> <p>Lowering Gamecock D and not designating Gamecock F could reduce scheduling flexibility for civil aircraft transit.</p> <p>Effects of chaff and flare use and electronic training transmitter siting would be the same as under the Proposed Action.</p>	<p>Alternative B creates Gamecock E high and low MOAs and proposes a higher floor to the lowered Gamecock D. These modifications could improve civil aircraft transit of the area when compared with the Proposed Action or Alternative A.</p> <p>Alternative B lowers the floor of Bulldog B to 3,000 feet AGL and does not extend Bulldog A under Bulldog B. Alternative B reduces aviation concerns and does not need avoidance bubbles due to the higher Bulldog B floor altitude.</p> <p>Potential airspace management requirements to deconflict civil aircraft users of the airspace would be less than under the Proposed Action or Alternative A.</p> <p>Effects of chaff and flare use and electronic training transmitter siting would be the same as under the Proposed Action.</p>	<p>No airspace modifications or expansion of SUA would occur. Airspace use and management would remain unchanged from current conditions. Chaff and flare use would continue in the existing airspace and existing training transmitter sites would be used for some training realism.</p>

Table 2-16. Summary of Impacts by Resource
(Page 2 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
NOISE			
<p>There are no changes proposed for MTRs or the Restricted Airspace over Poinsett ECR. There would be relatively little change from current conditions except in those areas where new airspace would be created or low altitude airspace would be extended.</p> <p>Military aircraft-generated noise is calculated in the 35 to 37 DNLmr range under Gamecock E and D/F. This is within the estimated ambient conditions of 35 to 44 dB and means that military aircraft could be noticed but would not be a major contributor to ambient sound conditions. Military aircraft contributions to noise would noticeably increase under the Bulldog A extension area from less than 35 DNLmr to 50 DNLmr. Military aircraft contribution to cumulative noise levels where existing MTRs overlap with the expanded Bulldog A MOA would discernibly increase from 36 DNLmr to a calculated 53 DNLmr.</p> <p>The calculated noise levels under the Bulldog A expanded airspace for the Proposed Action would be noticeable in the rural environment and are projected to increase the number of highly annoyed individuals from approximately 1 percent of the population to approximately 4 percent of the population.</p> <p>Noise level increases, although annoying, would all be below the 55 dB level identified by USEPA as the noise level below which adverse noise impacts are not expected to harm humans or animals, or damage property. Noise associated with construction of the training transmitter sites would be localized, intermittent, and of relatively short duration. During operation of the sites, noise due to human presence would be limited and confined to the general area of the site.</p>	<p>Noise levels would be the same as those calculated for the Proposed Action. This would apply to areas under new or modified airspace. New training transmitter sites could involve activities that would create transient noise. Such noise would be limited and confined and would not be expected to be intrusive to the surrounding community.</p>	<p>Noise levels under the Gamecock MOAs would be comparable to or lower than the Proposed Action or Alternative A. Lowering Bulldog B rather than extending Bulldog A would result in a calculated 39 DNLmr. This would be discernibly lower than under the Proposed Action or Alternative A and means that, under Alternative B, military aircraft could be noticed but would not be a major contributor to noise conditions in the area. The number of highly annoyed individuals would continue at approximately one percent of the population. Overall, noise levels associated with Alternative B are well below any thresholds that would be expected to cause harm to humans or animals, or damage property. New training transmitter sites could involve activities that would create transient noise. Such noise would be limited and confined and would not be expected to be intrusive to the surrounding community.</p>	<p>No additions or modification would be made to the military training airspace which currently supports the 20 FW, 169 FW, and other transient users. Noise levels resulting from the use of this military training airspace would remain unchanged from current conditions, and would be somewhat higher under the existing airspace than with the Proposed Action or an action alternative.</p>

Table 2-16. Summary of Impacts by Resource
(Page 3 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
SAFETY			
<p>ATI does not propose any changes to sorties and maintenance, ordnance use, or number of training flights. No specific explosives safety risks are associated with the Proposed Action or alternatives, as no elements of the Proposed Action have the potential to alter or modify explosives use. Overall flight safety risks would be somewhat reduced in the Gamecock MOAs. Flight safety risks would be minimally increased by the potential for bird/wildlife-aircraft strikes in the expanded Bulldog A MOA. In both the Gamecock and Bulldog MOAs, indicated risk from bird/wildlife-aircraft strike is not excessive. Civil aviation pilots expressed concern that, under the Proposed Action and Alternative A, the Gamecock E and F MOAs created higher concentrations of civil aircraft that posed a safety risk. FAA and Shaw AFB air traffic control would work together to avoid risks to civil aircraft flying under or above the proposed new airspace. Scheduling of airspace blocks would be done to assist civil aviation transit. The public expressed concern that the extension of Bulldog A could create a perception that safety at airports under the military airspace was reduced. Avoidance areas around the airports could somewhat allay public concern. Most chaff and flare plastic and aluminum coated wrapping materials that fall to the ground following deployment would not constitute a safety risk. The MJU-7 A/B S&I device weighs 0.7 ounces and could strike the ground with the force of a large hailstone. Cosmetic damage could occur annually to an estimated 1.0 vehicles under the Gamecock MOAs and 0.9 vehicles under the Bulldog MOAs. There would be a per year calculated risk of 0.005 or 5 in 1,000 years, 1 in 200 years that an unprotected person under either Bulldog MOAs or Gamecock MOAs could be struck by a falling S&I device. As with a large hailstone, this could bruise but would not be likely to cause serious injury. An estimated four dud flares a year could fall to the ground under the airspace. The possibility that a dud flare could strike and seriously injure a person is so minute that it can be essentially discounted. Dud flares that are not heated in excess of 1,200 degrees should not pose a safety risk; local agencies would be informed to notify Shaw AFB in the event that a dud flare was located.</p> <p>No wind vortex impacts are expected from an F-16 overflight within the Gamecock, Bulldog, or Poinsett MOAs. Ground safety risks from operation of existing and proposed new training transmitter sites would be minimal as the Air Force would continue to follow applicable regulations, technical orders, and Air Force Occupational Safety and Health (AFOSH) standards. The use of training transmitters in the proposed new locations would create no specific ground safety concern.</p>	<p>Safety aspects are essentially the same as those described under the Proposed Action. There are no specific proposals associated with the implementation of Alternative A that would create different safety issues.</p>	<p>Alternative B contains a split Gamecock E and a high floor for Gamecock D. These elements could improve the space and scheduling for civilian flights and reduce safety concerns. Alternative B establishes a 3,000-foot MSL floor for Bulldog B and does not extend Gamecock A. These elements would reduce public concern for safety around the local airports. The higher Bulldog B floor in the extension area would result in no expected additional risk for bird/wildlife-aircraft strikes in the area. Other safety aspects associated with airspace use, chaff and flare use, and training transmitter siting and use would be the same as described for the Proposed Action.</p>	<p>No changes to 20 FW training assets would occur. No changes to the use of chaff and flares in existing airspace and training would occur.</p>

Table 2-16. Summary of Impacts by Resource
(Page 4 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
AIR QUALITY			
Areas under the existing and proposed airspace modifications are in air quality attainment. No overall increase in emissions are anticipated from military aircraft training and nearly all training flights occur above the 3,000-foot AGL mixing height for emissions. The minor increases in emissions in the area of the expanded Bulldog A MOA under the Proposed Action would not affect local or regional air quality. Construction of electronic training transmitter sites could result in transient local increases in emissions that would not significantly affect local air quality.	Air quality effects would be the same as described under the Proposed Action. No air quality impacts are anticipated.	Air quality effects would be the same as described in the Proposed Action except that under Bulldog B, training flight emissions would be above the air quality mixing height and there would be no air quality effect.	Air quality would not change as a result of the No-Action Alternative.
PHYSICAL RESOURCES			
Physical resources include soil and water. Chaff and flare use and construction of training transmitter sites are the ATI elements with the potential to affect physical resources. Within the Bulldog and Gamecock MOAs, an average of one flare per 84 and 120 acres would be released, respectively. Flares are released above 5,000 feet MSL and burn out in 400 feet, so there is a low probability of a flare-caused fire affecting physical resources. Flare and chaff deployment produces inert plastic parts, aluminum wrapping (ranging from 1" by 1" up to 3" by 13"), and felt spacers. One piece of flare or chaff debris would be expected per 5 acres per year. The wrapping and felt would deteriorate to naturally occurring materials over time. The plastic is inert. Although a possible annoyance if found by a person, the flare residual materials are not expected to accumulate in quantities that could affect soil or water resources. Deployed chaff is thinner than very fine hair. Extensive previous research has shown little to no negative effects of chaff or flare ash on soil or water quality. The distribution of chaff would be approximately 3.85 grams (0.12 ounce) per acre per year in the Bulldog A/B MOAs and 3.89 grams (0.12 ounce) in the Gamecock MOAs (including Gamecock E) per acre per year. Chaff is not likely to accumulate or otherwise impact physical resources. No impacts are expected as a result of transmitter site construction. Each site is projected to disturb 0.6 acres, Implementation of standard construction practices would reduce the potential for dust or erosion. No significant impact would be expected on soil, water, or other physical resources.	Consequences under Alternative A would be the same as described under the Proposed Action. No significant impact would be expected on soil, water, or other physical resources.	Consequences under Alternative B would be the same as described under the Proposed Action. No significant impact would be expected on soil, water, or other physical resources.	No changes to physical resources would occur under the No-Action Alternative.

Table 2-16. Summary of Impacts by Resource
(Page 5 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
BIOLOGICAL RESOURCES			
<p>Average noise exposure to biological resources would be comparable to or slightly higher than that experienced in the current airspace, which has not resulted in significant negative impacts to wildlife or domestic animals. In areas where noise levels are predicted to noticeably increase (primarily extended Bulldog A under the Proposed Action and Alternative A), animals may be temporarily sensitive to the new noise levels. For example, animals may startle or temporarily shift habitat use or activities in areas under new low-level flight. Although species may vary in their response, past research has documented that most wildlife and domestic animals would habituate and return to normal activities. A particularly close or loud aircraft overflight could still produce a startle reaction and negative response in habituated animals. Such incidents would likely be random and infrequent.</p> <p>Special-status wildlife species would not be significantly affected by noise levels of the Proposed Action.</p> <p>Wood storks or other large birds are at risk of collision with military aircraft and are a safety concern for the pilots and aircraft. This would be the case under the extended Bulldog A area. Nest success of red-cockaded woodpeckers would not be affected by airspace modifications.</p> <p>No threatened or endangered species or their habitats were observed at three potential training transmitter sites under the Bulldog A MOA. Field surveys for threatened and endangered species would be conducted at other potential sites prior to final site approval and a determination would be made as to the potential effect to biological resources.</p> <p>Previous studies have documented that wildlife and domestic animals would not be harmed by residual chaff or flare materials. There is a very low likelihood of an individual animal being struck by falling flare debris. Chaff fibers, flare ash, and other residual material would not accumulate in amounts that would affect forage or water quality. Most animals would avoid chaff fibers and, even if they were ingested, they are unlikely to be available in amounts that could cause injury. There are no recorded cases of domestic or wild animals ingesting end caps.</p>	<p>Consequences would be the same as described under the Proposed Action. No significant adverse impacts are expected to biological resources or special-status wildlife species under Alternative A.</p> <p>No significant adverse impacts are expected from chaff or flare use under Alternative A.</p> <p>No threatened or endangered species or their habitats were observed at three potential training transmitter sites under the Bulldog A MOA. Field surveys for threatened and endangered species would be conducted at other potential sites prior to final site approval and a determination would be made as to the potential effect to biological resources.</p>	<p>Consequences would generally be the same as described under the Proposed Action. The higher airspace floor in the area where Bulldog A would not be extended raises the training altitude above the altitudes commonly used by wood storks and most other large birds. No significant adverse impacts are expected to biological resources or special-status wildlife species under Alternative B.</p> <p>No significant adverse impacts are expected from chaff or flare use under Alternative B.</p> <p>No threatened or endangered species or their habitats were observed at three potential training transmitter sites under the Bulldog A MOA. Field surveys for threatened and endangered species would be conducted at other potential sites prior to final site approval and a determination would be made as to the potential effect to biological resources.</p>	<p>No changes to biological resources would be expected under the No-Action Alternative.</p>

Table 2-16. Summary of Impacts by Resource
(Page 6 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
CULTURAL RESOURCES			
<p>In South Carolina, 29 National Register of Historic Places (NRHP)-listed properties are directly underneath the existing Gamecock MOAs or the proposed Gamecock E or F MOAs. NRHP resources under existing airspace are currently subjected to overflights without affecting their NRHP status. In Georgia, 36 properties listed on the NRHP are under the Bulldog A existing and proposed extension areas. Properties under the existing Bulldog A airspace with a 500-foot AGL floor are currently subject to low-level overflights without affecting their NRHP status. Some of the NRHP properties within the expanded Bulldog A MOA are currently overflown by military aircraft using MTRs. Although some individuals visiting properties could be annoyed by an overflight, it is not anticipated that expansion of Bulldog A would detrimentally affect cultural resources under the airspace.</p> <p>The amount of chaff and flares associated with the Proposed Action or alternatives would not increase but would be released over a greater area, further reducing the possibility of an adverse effect to NRHP properties. While the likelihood of chaff or flare residual components striking a property is minimal, at worst the potential damage would be similar to that of a large hailstone. Training transmitters will be located in areas selected for their proximity to services, and will be cleared for impacts from the Proposed Action or an alternative in consultation with the Georgia and South Carolina SHPOs, in compliance with Section 106 of the NHPA and, if needed, with the Catawba Indian nation and the Eastern Band of the Cherokee Indians. Therefore, no impacts are expected to cultural resources from the Proposed Action or an alternative.</p>	<p>As with the Proposed Action, it would be unlikely that changes in airspace associated with Alternative A would detrimentally affect any historic or cultural properties. Consequences would be as described for the Proposed Action.</p>	<p>Changes in the shape and use of airspace under Alternative B would not affect the NRHP eligibility of these resources, nor would continued use of chaff and flares. Consequences would be essentially the same as under the Proposed Action with the exception that training flights in the area under Bulldog B where Bulldog A would not be extended would be at higher altitudes than with the Proposed Action or Alternative A.</p>	<p>No changes to cultural resources would occur under the No-Action Alternative.</p>

Table 2-16. Summary of Impacts by Resource
(Page 7 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
LAND USE AND RECREATION			
<p>There would be no anticipated change in general land use patterns, land ownership, land management plans, or special use areas due to airspace changes or use of chaff and flares. Deposition of 1 piece of chaff or flare debris per 5 acres per year could result in annoyance if found by land owners or users of recreational areas, but it would not be expected to change or otherwise affect any land uses. Aircraft noise levels would not change appreciably above current levels under most airspace. Aircraft noise would not be expected to impact residential areas, farms, parks, or wildlife refuges. Although distributed over the year, there would be a small increase in training flights within sight of Magnolia Springs State Park that could result in annoyance to some people. In the expanded Bulldog A MOA, there would be an increase in low level training flights that could result in an increase of highly annoyed people from 1 percent to 4 percent of the affected population.</p> <p>Training transmitter sites are generally expected to be on agricultural land leased from private landowners. Land use would change on the 0.6 acres disturbed for each of the 6 training transmitter. Approximately 3 to 4 acres would be affected by changed land use under the Proposed Action. This represents a negligible amount of agricultural land. Training transmitter site selection would avoid special use areas such as wildlife refuges or other natural areas.</p>	<p>Consequences would be essentially the same as those described for the Proposed Action. There would be no anticipated change in general land use patterns, land ownership, land management plans, or special use areas. Training transmitter sites would not impact recreational uses in the area.</p>	<p>Consequences would be generally the same as those described for the Proposed Action. The primary difference is that average noise levels would be 39 DNLmr under Bulldog B as compared with 50 DNLmr under the Bulldog A/B MOAs with the Proposed Action or Alternative A. Calculated noise levels show that few, if any, additional individuals would be highly annoyed in the same area if Alternative B were selected. Approximately 2 acres would be affected for training transmitter sites under Alternative B. This represents a negligible amount of land.</p>	<p>No changes to land use or recreation would occur under the No-Action Alternative.</p>

Table 2-16. Summary of Impacts by Resource
(Page 8 of 8)

<i>Proposed Action</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>No-Action</i>
SOCIOECONOMICS			
<p>The proposed airspace modifications would not prohibit use of affected airways by general aviation. Altitude structures and FAA and Air Force air traffic controllers would reduce conflicts between military use and civilian air traffic. Life-flights to regional hospitals would be given precedence by Air Traffic Controllers, and would be expected to remain unimpeded by proposed changes to improve military training airspace. Concern was expressed by civil aviation pilots during scoping meetings that the lower level altitude structures of Gamecock E and F under the Proposed Action would interfere with flights, including air taxi operations. These concerns included having to fly at inefficient altitudes and in more turbulent air. The public expressed concern that the extension of Bulldog A had the potential to constrain economic development opportunities in communities under or near the expanded airspace. The Proposed Action somewhat reduces this concern through designation of a 3-NM by 1,500-foot AGL avoidance area around aviation facilities under the proposed airspace. Airports with Instrument Flight Rules (IFR) capabilities would be under air traffic control and would not be affected by proposed airspace changes. Airspace modifications under the Proposed Action could affect some civil aviation and reduce flexibility at some airports. This is not expected to impact regional socioeconomic resources or economic development in the counties underlying the airspace. Use of chaff and flares and resulting plastic, wrapping, and felt materials that fall to the ground would not be in quantities to affect socioeconomic resources. Any cosmetic or other damage, such as to a vehicle, would be handled through established claims procedures at Shaw AFB.</p> <p>Construction of proposed training transmitter sites would not discernibly affect employment and earnings. No long-lasting socioeconomic effects are anticipated as a result of transmitter site development for either the Proposed Action or any alternative.</p>	<p>Alternative A consequences are essentially the same as described for the Proposed Action. Alternative A airspace modifications are expected to have little or no impact to socioeconomic resources or economic development in the region. Chaff and flare use consequences would be as described for the Proposed Action.</p> <p>Economic pursuits and property values in the region are not expected to experience negative effects.</p>	<p>Alternative B has similar consequences to those described for the Proposed Action. The primary differences are that the Alternative B higher floors for Gamecock E and F and the Bulldog B MOA floor of 3,000 feet MSL reduces pilot and public concerns about socioeconomic impacts. Alternative B airspace modifications are not expected to impact socioeconomic resources. Chaff and flare use consequences would be as described for the Proposed Action.</p> <p>Economic pursuits and property values in the region are not expected to experience negative effects.</p>	<p>No changes to socioeconomic would occur under the No-Action Alternative.</p>
ENVIRONMENTAL JUSTICE			
<p>The rural areas of North Carolina and Georgia have not yet benefited from the economic growth in the more urban areas. Although some areas of counties under the airspace are relatively economically depressed, no significant impacts or disproportionately high or adverse effects to minorities, disadvantaged communities, or children are anticipated.</p>	<p>No significant impacts or disproportionately high adverse effects to minorities, disadvantaged communities, or children are anticipated.</p>	<p>No significant impacts or disproportionately high adverse effects to minorities, disadvantaged communities, or children are anticipated.</p>	<p>No changes to environmental justice would occur under the No-Action Alternative.</p>